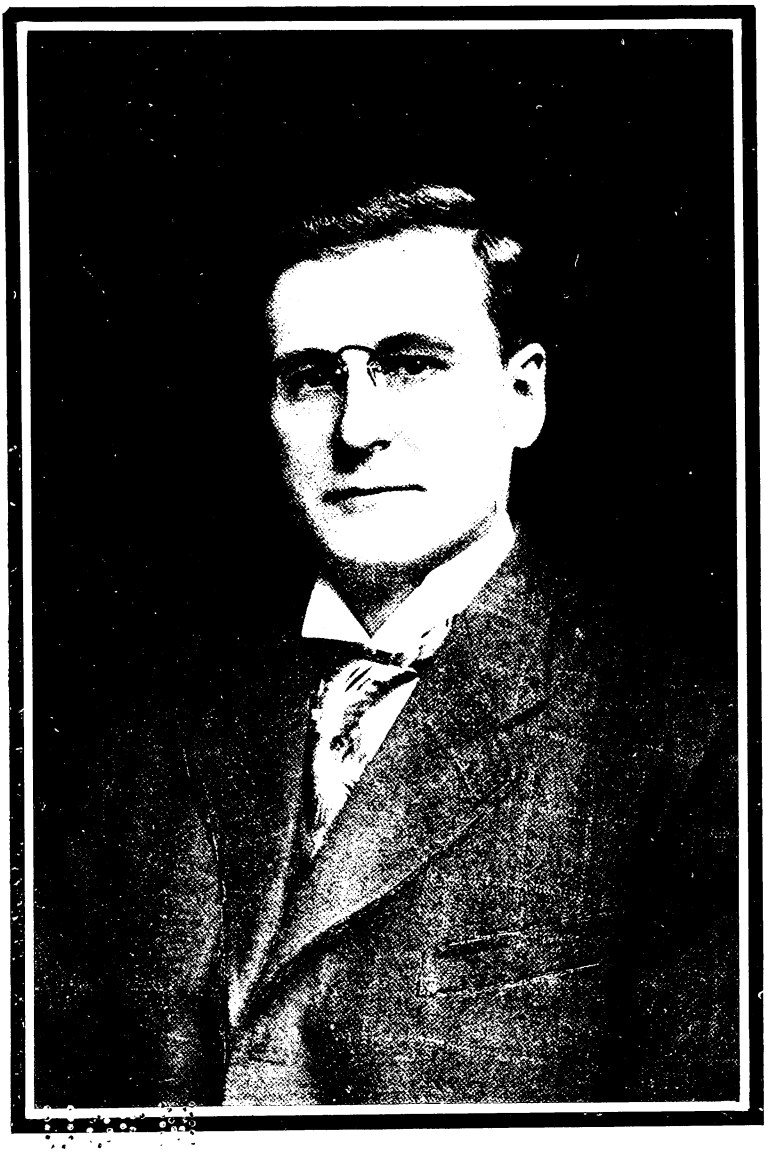


MR. JOHN QUINCY BYRAM.

The Gold Inlay.*

By Dr. J. V. Conzett.

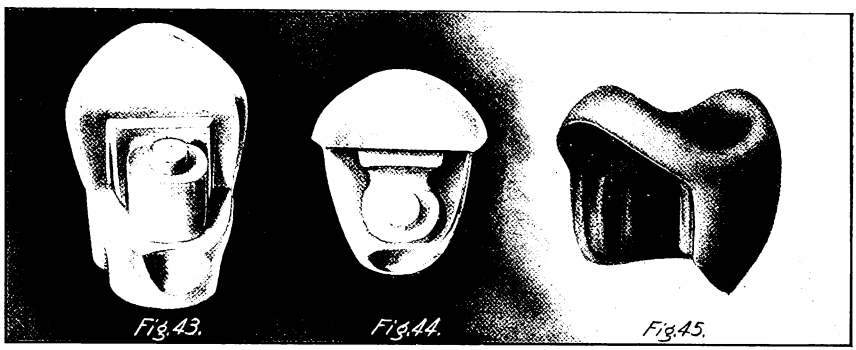
A frequent accident following the filling of a large cavity in the mesio-disto-occlusal surface of a bicuspid in which the pulp has been removed and the canal filled is the breaking of one of the cusps. It may be either the buccal or the lingual cusp, but either one makes a break that is very hard to restore with the usual methods of tooth restoration, and the temptation is to cut off the remaining cusp and crown the tooth. This may be very good practice in some cases, but I believe that the artificial crown is, or should be, the court of last resort in the salvation of the teeth; so if it is possible to save the remaining cusp in such a way that the usefulness and the æsthetic value of the tooth is preserved without resorting to a crown it is better to do so. This can be very beautifully accomplished in several ways by the use of the inlay combined with the pin in some cases, and other mechanical retention devices in other cases, all of which will be described in proper order.

Inlay Restoration of Lingual Cusp.

When the lingual cusp of a bicuspid is broken off we will usually find that the break extends under the gum for some distance. In fact, we frequently find such cases presenting with the broken cusp still adhering to the gum and causing considerable irritation by its movement under the stress of mastication. The first step is the removal of the

broken piece, of course, and the packing of the space with gutta-percha, that the gum may be crowded away from the break. The canals must be placed in a sterile condition, and then we are ready for the operation of restoration.

There are two ways in which these cases may be treated, according to the condition that presents. One way is to ream out the canal and fit an iridio-platinum post into the root canal, cement this to place and build



the cement upon the tooth into some semblance of the missing cusp, when you have a basis for the excavation of a cavity for the retention of an inlay that is to restore the lost cusp. The gingival portion of the cavities in the mesial and distal portions of the tooth, and the portion of the lingual surface that represents the broken portion as well, are made into as flat a seat as it is possible to make under the circumstances. The walls mesially, distally and lingually are paralleled as nearly as possible, as illustrated in Fig. 43, and a groove is made in both the mesial and distal surfaces in the axial walls from the occlusal surface to the gingival seat. Most of this preparation is made in the cement, which is made possible by the pin anchored in the root canal. It is evident that the post to be of service in this capacity must be long enough to reach almost to the occlusion of the cusp. The grooves are for the purpose of preventing lateral displacement, and as before stated, are cut almost entirely, if not quite, in the cement. The occlusal surface is cut low enough to allow for sufficient body of gold to resist the stress of mastication, and thick enough to prevent the grinding of the opposing teeth from ever wearing through it. It is best to slightly groove this surface mesio-distally, thus uniting the grooves in the axial walls, adding thereby a little more resistance to lateral displacement. The cavo-surface angle all around the cavity is to

be well beveled and the remaining cusp is to be slightly ground down and beveled, that the gold may be carried over it to protect it from a stress that might break it off. Observe that the metal post protrudes above the cement. (Fig. 43.) This, engaging a corresponding depression in the under surface of the inlay, serves to anchor the inlay in such manner that the cement mass is protected from movement under stress.

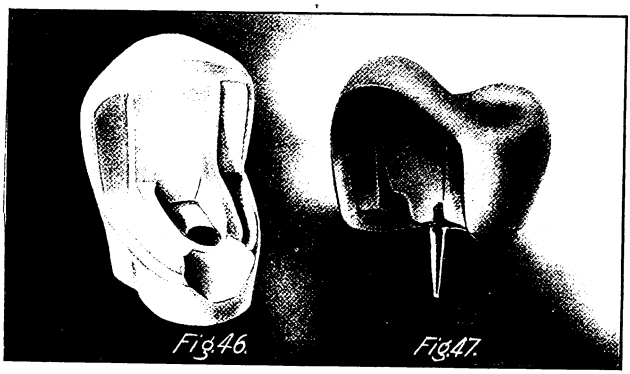


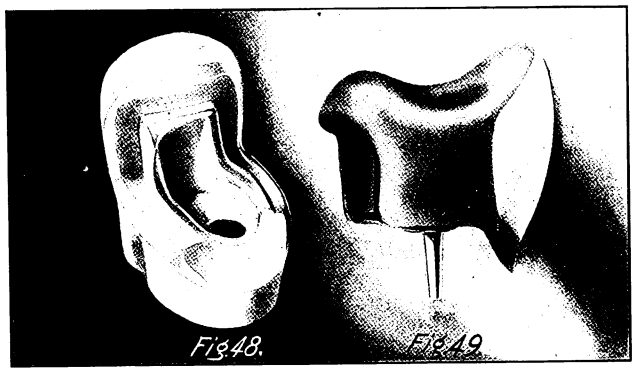
Fig. 43 is a view of the cavity from the lingual aspect, and Fig. 44 a view of the occlusal surface, in which illustration is seen the grooves in the mesio and disto-axial walls. Fig. 45 is the inlay restoration of lingual cusp and occlusal surface.

Second Method.

The other method of restoring the same case is to prepare the tooth as it presents without any building up with cement. The root is reamed out for a pin which is fitted to the root canal, and the rest of the tooth is prepared for the withdrawal of the inlay pattern. The seats should be squared and the walls made as nearly parallel as possible; the cavo-surface angle beveled, of course, and the whole cavity prepared along the lines heretofore indicated. With the pin in place the inlay wax is forced into the cavity, shaped as desired, chilled and the whole removed, when it will be found that the pin will, or ought to, come out with the wax, thus completing the pattern, which is then treated as any ordinary inlay, invested and cast. The result is illustrated in Fig. 47, while the cavity for which it is made is shown in Fig. 46. This latter method is the one that is the more frequently used by the author, as it seems to be the stronger method and is more quickly made, which is a reason that appeals to the busy man.

Restoration of Buccal Wall.

When the buccal wall of a bicuspid breaks off it is not usually advisable to treat it in either of the two ways that have been illustrated, because of æsthetic reasons. If the tooth is in the mouth of a man who wears a beard, or for any other reason æsthetics do not enter into consideration, then either of these methods is as applicable for a break of the buccal as for a lingual cusp, and has the merit of

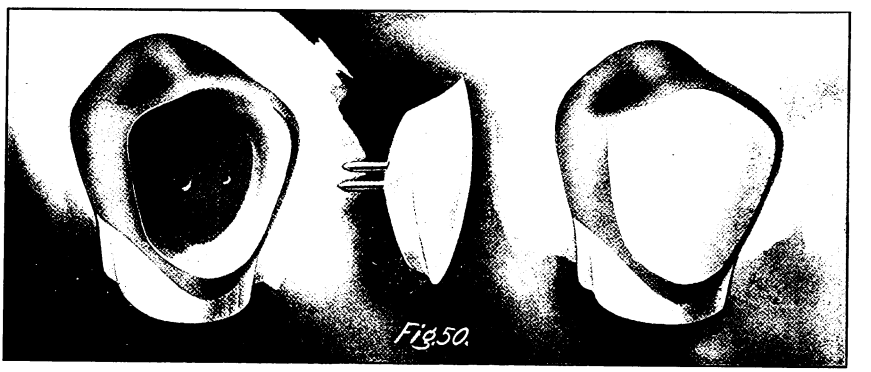


greater strength than the method that we hope to illustrate as a method of more æsthetically restoring the lost cusp.

There are also two ways in which a broken buccal cusp may be restored to usefulness. First: Prepare the cavity, with all walls so made that the inlay pattern will withdraw, making the seats as flat as possible and the axial walls as nearly parallel as may be, being careful to give a good bevel to all of the margins. The root canal is to be reamed out for the reception of an iridio-platinum post of as large a diameter as is consistent with the strength of the root. The post is to be placed in position and an ordinary flat back plate tooth selected that will be of the proper shade and size for the restoration of the desired cusp, and this is to be ground to fit. When the desired fit is obtained some inlay wax is warmed and the facing is to be pressed into it and then warmed again and the wax, with the contained facing, is pressed into the cavity and fitted into its proper place as a restoration of the missing wall. The mass now is to be chilled and the wax carved into the desired shape, care being taken to see that there is plenty of wax over the occlusal surface of the porcelain cusp that it may have a sufficient mass of gold in the finished product to protect it from the stress of occlusion and mastication. When satisfied that all is as it should be the wax is again thoroughly chilled and the whole is removed. We now have the wax model containing the porcelain facing, and while there are those who say that

gold can be cast directly upon porcelain (a fact which I admit, for I have repeatedly done it), I do not advise doing it in this case.

The pattern is now invested in a little investing compound, leaving the porcelain facing exposed. When the plaster has thorougly set the facing is carefully freed from any overhanging plaster and slightly warmed by holding a hot instrument upon it for a minute or two, when the facing can be lifted out of the wax, leaving a perfect impres-



sion of itself in the wax. The pinholes in the wax are now filled with carbon points, obtainable from the dealers for that purpose, the sprue wire affixed and the whole flasked and cast as usual. Fig. 48 is an illustration of the cavity prepared for a restoration of this kind, and Fig. 49 is a reproduction of the finished inlay with the porcelain facing cemented to place, which is done after the casting is made and finished up. In Fig. 50 is seen the inlay and facing before cementation. Fig. 50 shows another view of the cast inlay, the facing, and the facing and inlay after cementation. This method is not original with the writer, but was first shown by Dr. W. R. Clack, of Mason City, Iowa, from whom the writer obtained it.

Second Method.

The second method, and one used a great deal, is to prepare the cavity as described for the first method, fit the pin in the root canal and then warm the wax and build up the pattern exactly as though the entire restoration was to be made of gold. When the wax has been carved to the proper shape and occlusion it is cooled and removed from the tooth. The pattern is now invested in a little of the investment material, leaving the buccal surface exposed. When the investment is hard a portion of the wax is removed with a Roach suction carver. Enough of the wax is removed to take in almost all of the buccal aspect, only a rim of wax being left all around. Enough should be left on

the occlusal surface, however, to supply a sufficient body of gold to protect the porcelain. The sprue is now placed and the pattern invested in a flask and the process of casting carried forward to completion. When the inlay is cast it will present with the buccal surface hollowed out, as it was done with the Roach instrument. This depression is now filled with a low fusing porcelain body and a facing is thus baked into the inlay. The artistic individuality of the operator is allowed full play in an operation of this kind, and the finished product is a demonstration of his artistic ability. This method has the advantage of making possible a porcelain restoration of a cusp that would be too thin to allow of the grinding in of a plate tooth, and will be of obvious advantage in many conditions and under many circumstances, and has given the writer a great deal of pleasure in the restoration of conditions that were otherwise seemingly impossible without resorting to a crown. The inlay pattern will be practically as in Fig. 50 except that the box cut for the reception of the porcelain should have square walls, for the better retention of the fused porcelain. The general appearance when finished would be practically as in Figs. 49 and 50.

Dental Radiography.*

By Howard R. Raper, D.D.S.,
Professor of Operative Technic and Roentgenology at Indiana Dental College, Indianapolis.

Making Radiographs.

CHAPTER IV.

The X-ray picture is variously called radiograph, skiagraph, Roentgenograph, radiogram, skiagram and Roentgenogram. The word radiograph is a combination of a Latin and Greek word meaning *ray* and *write* or *record*. The word skiagraph (spelled also sciagraph) is a combination of two Greek words meaning *shade* or *shadow* and *write* or *record*. The word Roentgenograph is a combination of a proper name, Roentgen, and the Greek word meaning *write* or *record*. The terminal gram occurring in the words radiogram, skiagram and Roentgenogram —as well as the more common words such as telegram, program, epigram, and others—is of Greek origin and denotes that which is written or marked.

The use of the X-rays for radiographic work depends on two properties of the rays. First, they penetrate substances in direct proportion to the density of the substance, and second, they affect the photographic plate or film the same as white light does.

Photographic Plates.

A photographic plate is a piece of transparent plate glass about an eighth of an inch thick, one side of which is coated with an emulsion of a silver salt, usually silver bromide, and gelatine, albumen, or collodion. The use of the gelatine, albumen or collodion is simply to stick the salt to the glass. When a thin coating of this emulsion has dried on the glass we have what is called the photographic "dry plate." In appearance it is similar to translucent greenish white glass, but on close inspection, one is able to detect than one side is a little less glossy than the other. The less glossy is the coated side, also called the sensitive, the film, or the emulsion side of the plate. The term "dry plate" is today an almost superfluous one, practically all the plates used being dry plates. There is, however, a photographic plate known as the "wet plate," but, since it is never used in radiography, I shall not describe it.

The dry plate is made in the absence of white light, put up in light-proof packages, and so supplied to consumers. These packages must not be opened except in a dark room, for the slightest exposure to a white light will spoil them.

The difference between the photographic dry plate and the photographic film is only that the plate is a piece of glass coated with a silver salt, while the film is a thin sheet of transparent celluloid coated with a silver salt. As with the plate, the sensitive side of the film is a little less glossy than the uncoated side. The film curls slightly toward the coated side, unless it is of the "non-curling" variety, when it is straight, or may even curl slightly away from the coated side.

Special X-ray Plates and Films.

X-ray pictures may be taken on ordinary photographic plates or films made to be used in cameras. While this may be done, the results obtained are not nearly so good as when special X-ray plates and films are used. The special X-ray plates and films differ from the ordinary plates and films in that a thicker coating of the emulsion is put on them. This is sometimes accomplished by coating the celluloid or glass two or three times, one coat on another. When this is done the film or plate is said to be multi-coated. X-ray films and plates should not only be thickly coated, but, which is more important, should also be extremely sensitive—that is, easily acted upon by light—for, though the X-rays have a wonderful power of penetration, their action on the silver emulsion is feeble compared to the white light of day.

The following manufacturers make X-ray plates of any desired size: The Seed Dry Plate Mfg. Co., St. Louis, Mo.; The Eastman Kodak Company, Rochester, N. Y.; Cramer Dry Plate Company, New York

City; Hammer Dry Plate Company, St. Louis, Mo.; The Lumiere N. A. Company, Burlington, Vt.; and the Ilford Mfg. Co., Ilford, London, England (American agents for Ilford goods, E. B. Meyrowitz, 104 East 23d Street, New York City). But two manufacturers, the Ilford Mfg. Co., London, Eng., and the Eastman Kodak Co., Rochester, N. Y., make special X-ray films.

I wish here to advise against buying large quantities of either plates or films at a time. They deteriorate in a few months.

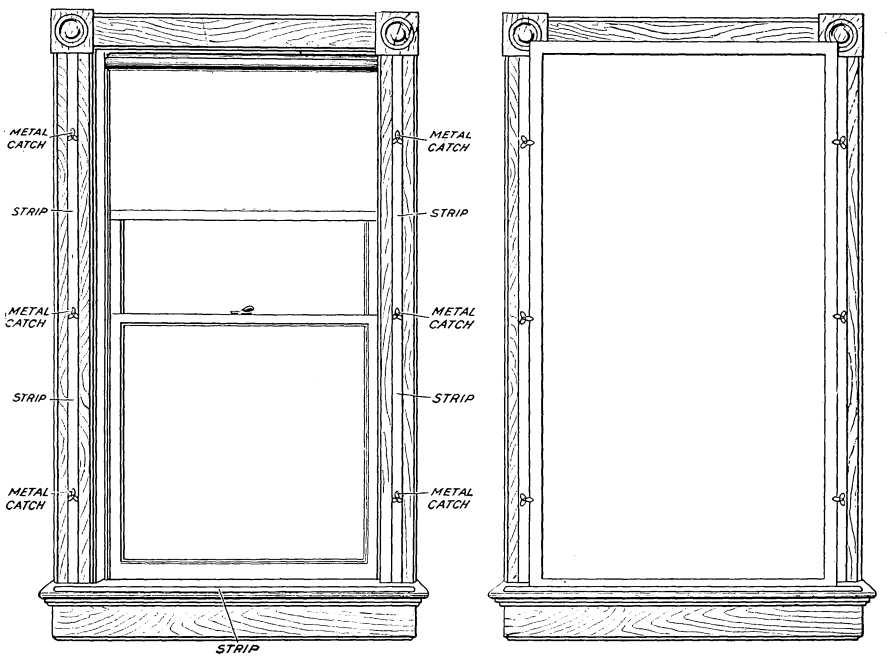


Fig. 67. To left, window ready for frame. When frame is in position the metal catches are turned to hold it. The frame fits inside of the strip on the sill. Figure to right shows frame in position.

Technic of Making Radiographs.

The making of a radiograph of the hand is one of the simplest operations in radiography, and for that reason it will be described to teach elementary principles. The following technic of making a radiograph will, of necessity, be much broken into by descriptions of materials and appliances used.

A 5 x 7-inch plate is about the right size to make a radiograph of the hand. Plates are supplied by the manufacturer packed in light-proof boxes, holding usually one dozen plates, with the warning on the box, "Open only in a dark room." The "dark room" is simply what the name

states—a room from which light is excluded. A closet without a window makes a good dark room, except that there is seldom running water in it. It is not absolutely necessary to have running water in the dark room, but it is very convenient. If a closet cannot be utilized a room, light-proof except for one window, may be made dark by covering the window with a frame on which is tacked some material such as the leather or rubber used for side and storm curtains in buggies. If this material does not completely turn the light, it should be painted with thick black paint.

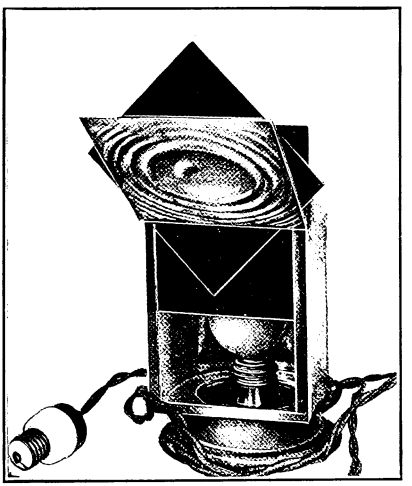


Fig. 68. Dark Room Lantern.

The frame should be made to fit over, not into, the window casing. (Fig. 67.) With the frame so placed, if a little light comes in around it, it does not come directly into the room, but is reflected to the side. The more perfect the darkness of the room the better, but the *very little* light which can enter through a window with the blind drawn down, and with a well-made frame over it will not cause any trouble. Of course, if the door to the room permits light to leak in around it, such light should also be shut out.

It would be impossible, of course, to work to any advantage in a perfectly dark room, for we could not see what we were doing. Hence the necessity of having a dark room lantern (Fig. 68), which will give a sufficient light to guide us in our work, without being of such nature as to have any action on plates or films. The term "developing light"—the light given by the dark room lantern—may mislead one to believe that the light in some way aids in developing a plate by its action on it. But such is not the case. The light is of value only because it enables the

worker to see. The light may be a candle, a coal oil lamp, or an incandescent electric light shining through red glass. While such a lantern can easily be made, the writer warns against it, for, though the light of a home-made lantern may appear the same to the eye as the light of the lanterns manufactured by photographic supply manufacturers, its action on a plate or film may be disastrously different. The lantern shown in Fig. 68 consists of a 16-candle power incandescent light with a frosted glass bulb, in a light-proof tin box, the front of which is of removable

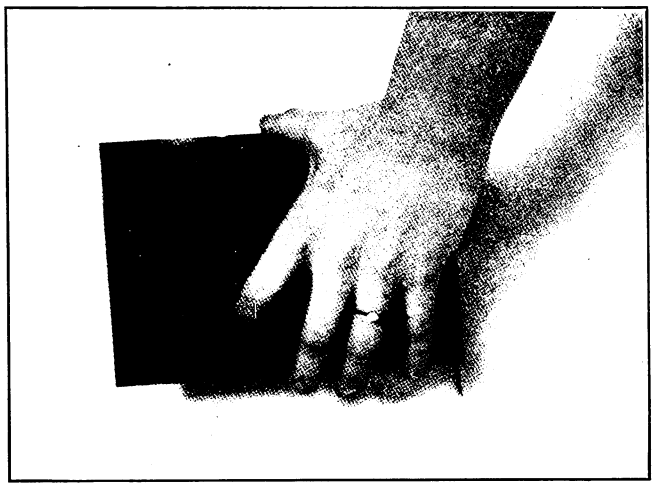


Fig. 69. Showing how to handle a plate by its edges.

glass. The light shines first through the frosted glass of the bulb, then an orange-colored glass, then a ruby glass.

In the dark room, with only the light of the dark room lantern we open our box of plates,* take out one, carefully close the box, and place the plate in an envelope of black, light-proof paper just large enough to receive it. Now place plate, black envelope, *et al,* in another envelope of black and orange-colored paper, putting the open end of the first envelope in first. We may now expose this package to ordinary daylight and artificial light with impunity, and the plate is ready for use in the making of a radiograph. These envelopes are obtained from the plate manufacturers.

*Experienced photographers prefer to handle sensitive plates in absolute darkness, and soon learn to detect the film side of the plate by feeling lightly with the fingers, thus obviating the need of the dark room light when "loading" plates.—Ed.

While in the dark room, before putting the plate in the envelope, we must note which is the sensitive side, and bear this in mind until the outside envelope is marked properly to designate it. As formerly stated,

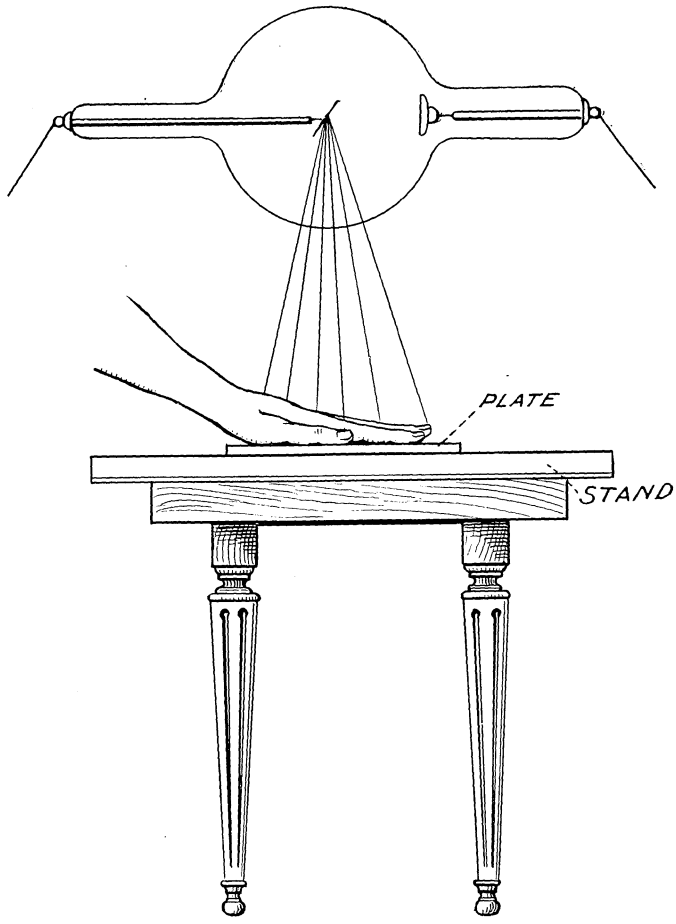


Fig. 70. Showing relative positions of tube, hand, and plate for making a radiograph of the hand.

the sensitive side is a little less glossy. Another way to determine which is the coated side is to look through the plate just *at the edge*. When the glass side is up, one is able to look through the glass and see the film beneath. The sensitive side of the plate should present toward the smooth side of the envelope—away from the seam side.

The plate should be handled by the edges (Fig. 69). This applies to the handling of the plate at all times, and to the handling of the film as well. Unless the fingers are wet or greasy, touching the sensitive side of the plate is not likely to result in spotting the picture, but it is always well to eliminate as many chances of failure as possible.

We are now ready to arrange tube, hand, and plate in their proper relative positions to take the picture. In all radiographic work it must constantly be borne in mind that we are making a shadow picture; that we are simply throwing a shadow on the plate, using X-rays as the source of light.

Lay the plate on a stand, sensitive side up. Place the hand on the plate. Adjust the tube at a variable distance directly above the hand. (Fig. 70.)

The distance from the tube to the hand may vary from about 10 to 20 inches, measurements being taken from the target, not from the glass of the tube. It is not necessary to have the target and the plate parallel to one another (in the same plane) as some writers direct. On the contrary, the position as in Fig. 70 is a better arrangement.

Assuming now that the tube is properly hitched to the coil and working properly, we are ready to make the exposure—to take the picture.

In giving demonstrations, I find that at this point someone invariably volunteers to "turn out the light." This is not necessary. The only reason for having the rooms even slightly darkened is to enable the operator to observe how his tube is working. The picture could be taken in bright daylight; the envelopes will protect the plate against all light except the X-rays.

When the switch is turned on and the X-rays produced, they the rays, shine down on the plate penetrating the paper of the envelopes as though the plate were not covered at all. The rays penetrate the hand also and act upon the plate beneath. They penetrate the bones of the hand less readily than the flesh, and hence there is less action on the plate directly beneath the bones. In other words, there is a shadow of the hand thrown on the plate, the shadow of the bones being denser than the shadow of the flesh. The shadow of the flesh, in fact, may be so light that it is scarcely discernible, or even entirely blotted out. This is the case when a very high tube is used and a long exposure made.

Duration of Exposure.

The length of time of the exposure of the plate to the action of the X-rays when making a radiograph depends on several things. (1) The milliamperage sent through the tube. Other factors remaining the same, the more milliamperage sent through the tube the shorter the exposure necessary. A coil equipped with a milliampere

meter enables the operator to observe the exact number of milliamperes passing through the tube. (2) The nature of the X-rays. Other factors remaining the same, the more penetrating the X-rays the shorter the exposure necessary. The higher the vacuum of the tube up to a given point, the more penetrating the rays from it. A low tube is useless for radiographic work. (3) The distance of the plate from the tube. Other factors remaining the same, the shorter the distance between the plate and

Fig. 71. Radiograph of the hand, made from a pose similar to Figure 70. (Reduced one-half.)

the tube the shorter the exposure necessary. (4) The thickness of the part to be radiographed. Other factors remaining the same, the thicker the part the longer the exposure necessary. (5) The density of the part to be radiographed. Other factors remaining the same, the denser the part the longer the exposure necessary. (6) The sensitiveness of the plate. Other factors remaining the same, the more sensitive the plate the shorter the exposure necessary. The product of some manufacturers is more sensitive than others. As a plate or film grows old it becomes less sensitive, finally becoming entirely useless.

It will be seen from the foregoing that so many things enter in for consideration that the exact time of exposure cannot be stated with any

degree of clearness. Elaborate systems of calculation have been worked out so that if the distance of the tube from the plate, the penetration of the X-rays measured with a penetrometer, the milliamperage sent through the tube, and the thickness of the part be known, reference can be made to a printed table and the exact time of exposure necessary learned. While commending such work as efforts along the right line, I consider them failures so far as practical application in dental work is concerned. Notice that in the calculation the density of the part and sensitivity of the plate are not taken into account at all.

Each man must learn to properly time his exposure by personal experimentation. This statement is likely to be contradicted by those who construe it to mean that no idea at all of the time of the exposure can be learned except by experiment. That is not what I am saying, however. The idea I wish to convey is that these tables of calculation, on the time of exposure, give only the approximate length of time of exposure necessary, and that a very little experience and the use of judgment renders them useless. They are always useless except when a penetrometer is used and the coil is equipped with a milliampere meter.

To make the negative (the picture on the glass of the plate) of the radiogram shown in Fig. 71, the factors were as follows:

1. Machines used—an 18-inch induction coil, with a two-point electrolytic interrupter, operating on 110-volt, D. C. circuit. All resistance of rheostat cut out.

2. Strength of current. Machine not equipped with ampere meter or milliampere meter. Approximate amperage of the primary current, 26. Secondary current sufficiently powerful to obtain a fat, fuzzy spark 10 inches long.

3. Penetration of X-rays. Tube backs up 7 inches of parallel spark. Distances of tube regulating spark gap 4 inches. Therefore, the tube is high and the rays from it quite penetrating when it is properly lighted.

4. Distance of target from plate. Seventeen (17) inches.

5. Thickness of part. That of the hand, about 1½ inches at thickest part.

6. Density of part. That of hand.

7. Plate used. Lumiere special X-ray plate. (An ordinary plate might have been used to take such a picture.)

8. Time of exposure of plate to action of rays. Five seconds.

9. Time plate remained in developer. Two and one-half minutes.

It should always be the effort of the operator to make the exposure as short as possible (though it was not done in this instance), so that the patient may not be unnecessarily exposed to the X-rays. So far as

overexposure of the plate itself is concerned, however, we, in dental work, need not fear it much. If we expose the plate unnecessarily long we may correct our mistake by leaving it in the developing solution a shorter length of time.

During exposure, patient, tube and plate must be perfectly immobile. After the exposure we are ready to "develop the negative."

Method of Development.

Remove the plate from the envelope in the dark room, exposing it only to the ruby light. It has not changed in appearance at all. It still looks like a piece of translucent, white glass. But the picture is there. It needs only to be developed.

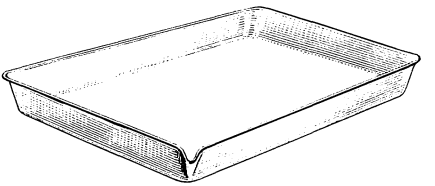


Fig. 72. Trays for developing and fixing solutions.

This is done by immersing the plate, sensitive side up, in an aqueous solution of chemicals, the developer. This developer oxidizes the silver which *has* been acted upon by the X-rays, but *does not* oxidize the silver which *has not* been acted upon by the X-rays.

Place the plate in the tray (Fig. 72) containing the developer with the film side up, quickly covering the plate with the solution. It is better to begin development in absolute darkness, not turning on the lantern till needed for first examination of the plate, and even then using as little light as possible. A dark room lantern may be comparatively safe, but when handling plates so sensitive that a photograph may be taken in a thousandth of a second, no light at all is safer still. Many properly exposed plates have been "fogged" in the "dark" room. Trays can be purchased from any photographic supply house. Always use a tray sufficiently large to easily receive the plate. The action of the developer will be hastened and made more uniformly perfect by slightly raising then lowering one end of the tray, and so moving the developer over the surface of the plate.

The length of time it takes the image to "come up" or show varies according to the length of exposure. The shorter the exposure the longer the plate must remain in the developer. For example, when the negative of Fig. 71 was made three others were made, all the factors remaining the same—same machine, same strength, current and so on—except the time of exposure and the time the plate was left in the developer. One plate was exposed 2½ seconds, and was left in the developer five minutes;

another was exposed 10 seconds and left in the developer two minutes, and another was exposed 30 seconds and left in the developer 1½ minutes. The four finished negatives are so nearly alike that they can scarcely be distinguished one from the other.

Developing is not completed as soon as the image shows. Sometimes the image can be seen better by removing the plate from the developer and holding it up to the ruby light. If the exposure has been well timed the "high lights" will commence to appear (*i.e.*, the plate will begin to turn dark in places) in about 15 or 20 seconds, and the image can be seen tolerably well in 30 or 40 seconds. If this is the case the plate should be left in the developer about 5 minutes. From the foregoing we may make the following rule: Leave the plate in the developer about 20 times as long as it takes for the high lights to appear, or 10 times as long as it takes for the image to appear. This is not an inflexible rule. Indeed, no inflexible general rule can be made, because of the difference in the action of different developers. Another rule is to leave the plate in the developer until the image is about lost—and the plate seems almost black.

The actual time of developing will vary; 2 or 3 minutes for over-exposed plates; about 5 minutes for plates which have been well exposed; 15 to 40 minutes for under-exposed plates.

There are a very great many different developing formulas, any one of which may be used. In making up developers, chemicals should invariably be dissolved in the order as named. The following are some of the most popular developer formulas:

M—Q Developer

	Avoirdupois	Metric System
Water	10 ounces =	300 c.c.
Metol	7 grains =	1½ grammes
Hydrochinon	30 grains =	2 grammes
Sulphite Soda (desiccated)	110 grains =	7 grammes
Carbonate Soda (desiccated)	200 grains =	13 grammes
10 per cent. solution Bromide Potassium	40 drops =	40 drops

Hydrochinon Developer

No. 1

	Avoirdupois	Metric System
Hydrochinon	300 grains	20 grammes
Sulphite of Soda	6 ounces	180 grammes
Water	48 ounces	1,440 c.c.

No. 2

Carbonate of Potassium	4 ounces	120 grammes
Water	32 ounces	960 c.c.

To Develop, take

No. 1, 6 ounces (180 c.c.); No. 2, 4 ounces (120 c.c.); 10 per cent. solution Bromide of Potassium, 3 to 10 drops. Mix the developers in the order given, and use cold.

PYRO DEVELOPING FORMULA

Pyrogallic Acid Solution

"A"

	Avoirdupois	Metric System
Pyrogallic Acid	1 ounce	30 grammes
Sulphuric Acid	20 minims	1 c.c.
Water	28 ounces	840 c.c.

SODA SOLUTION

"B"

	Avoirdupois	Metric System
*Carbonate of Soda (Anhydrous)	2 ounces	60 grammes
*Sulphite of Soda (Anhydrous)	3 ounces	90 grammes
Water	28 ounces	840 c.c.

*If crystals are used, double the quantity.

TO DEVELOP, take

"A," 1 ounce (30 c.c.); "B," 1 ounce (30 c.c.); Water, 8 ounces (240 c.c.). This developer will then contain 1.56 grains Pyro per ounce.

The developer may be made and kept in stock solutions as above, if desired. A better plan is to buy the prepared developing powders. They may be purchased at any photographic supply store. The chemicals come in glass tubes or packages mixed in the proper proportions, and all that is necessary to make the solution is to dissolve them in the quantity of water (distilled or tap water either) suggested on the package. The package or tube usually contains a sufficient quantity to make 4 to 8 ounces of developing solution. The advantages of this over mixing the chemicals yourself are: First, the convenience and saving of time, and second, only small quantities being made at one time, the developer is used immediately, and is therefore always fresh when used.

A developing bath does not keep well in stock solution unless the bottles are full and well corked. Even then discoloration and disintegration occurs in the course of a month or so. It is always advisable to use as fresh a solution as possible. Packed in the box with the plates will always be found a formula for a developer recommended by the manufacturer of the plates. It is not at all necessary to use the particular developer recommended.

Temperature.

During the hot summer months it is necessary to use ice in the developer, ice water to make the solution, or place the tray containing the developer in another larger tray with ice water in it. If the developer is too warm it will soften the emulsion, cause frilling at the edges, blistering and fogging of the negative. The developer should be between 60 and 75 degrees F. If too cold development takes place slowly, and the negative, when finished, is pale and thin. I use tap water in the winter and have no trouble due to improper temperature. In the summer, though, even using ice water and ice, the work is often discouraging. If possible during the hottest weather defer development until the cool of the evening.

Fixing. When development is complete, remove the plate, dip it in clear water, then immerse it in the fixing bath. The fixing bath is a solution of chemicals which dissolves out the unaffected silver. Leave the plate in the fixer for two or three minutes after the milky appearance of the glass side of the plate has disappeared. A plate must be removed promptly from the developer as soon as development is complete, or the negative will be overdeveloped, spoiled, but it may be left in the fixing bath for hours longer than necessary without danger of spoiling the negative.

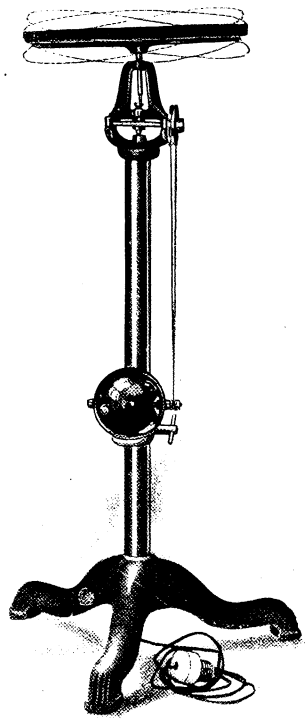


Fig. 73. Titubator.

It will not injure the plate to remove and replace it in the baths at any time during developing or fixing.

The actual time required for fixing varies from 5 to 20 or 30 minutes. The thicker the emulsion the longer time it requires for fixing. Movement of the fixing solution over the surface of the plate will hasten fixing. A titubator (Fig. 73) is a machine on which the fixing bath tray may be set, and the bath kept in constant movement over the plate.

When several negatives are being made at the same time, it is well to use a fixing box (Fig. 74) instead of a tray. If the plates were piled one on another in the tray, they would probably stick to one another and, when pulled apart, the emulsion would be scarred. The plates stand on end in the fixing box, fitting into grooves.

Hyposulphite of soda is the standard fixer. There are not a great number of fixers, as there are of developers, to choose from. Hyposulphite of soda and water alone will fix plates, but is not so efficacious as when other chemicals are added to harden the emulsion.

ACID FIXING BATH

	Avoirdupois	Metric System
Water	64 ounces	2 litres
Hyposulphite	16 ounces	450 grammes
Sulphite of Soda (Anhydrous)	¾ ounce	20 grammes
When fully dissolved, add the following hardener:		
Powdered Alum	½ ounce	15 grammes
Citric Acid	½ ounce	15 grammes

A stock solution may be made as given in the foregoing formula, or the prepared fixing powder purchased, and the fixing bath made by simply dissolving the powder in a stated quantity of water. There is nothing secret about the formulas of the prepared fixing powders. They are all practically the same as the formula given. The advantage in using them lies in the saving of time and energy that would otherwise be spent weighing chemicals. If prepared developing and fixing powders are used, it will not be necessary to have a pair of scales for this work. A graduated glass for measuring liquids will be all that is needed. During the hot months, it is expedient—not necessary—to use a freshly mixed fixer. If this is done the negative is less likely to frill or blister. Unlike the developing bath, however, the fixing bath will keep without disintegration for months. If scum or sediment appears after standing for some time, this may be removed by filtering the solution through filter paper or cotton.

The temperature of the fixer should be at least as low as that of the developer and better lower, say about 50 degrees F.

When fixed, if the plate is held up to the light (any light, for the plate is no longer sensitive to light), the shadow of the bones of the hand will appear as transparencies; the flesh shows a little less transparent than the bone, and the balance of the plate will be opaque and black. Thus the shadows show light, and where no shadow was thrown the plate is dark. Hence the name negative which is applied to this picture on the plate. The making of the positive picture on paper, the print, as it is usually called, from the negative will be described presently. The

plate is no longer sensitive to white light, and may therefore be exposed to it any time after having been in the fixer a minute or so.

Great care must be exercised not to get any of the fixing bath into the developer. A very little "hypo" will spoil the developer. It is well to label the trays so that the tray used to hold the fixer one time will not be used for the developer another. Or, instead of labeling, a white tray may be used for one bath and a black one for the other.

Washing.

When fixing is completed the negative must be washed in clear water to remove all "hypo" from it. If the negative be placed in a tray, the tray in a basin or sink and the tap turned up, or, in other words, if the negative

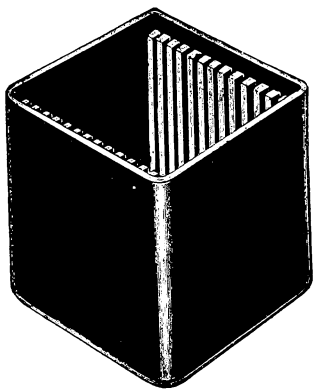


Fig. 74. Fixing box.

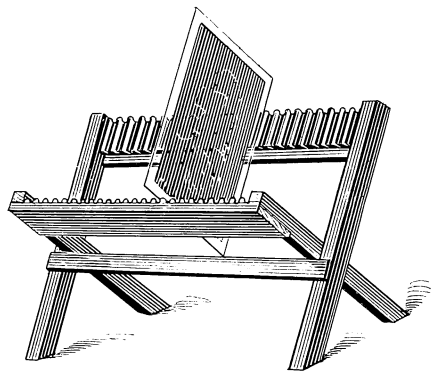


Fig. 75. Plate, or negative, rack.

be washed in running water it requires 15 to 30 minutes to thoroughly wash it. Where running water can not be had,* and sometimes during hot weather when tap water is too warm, the negative may be placed in a larger vessel of water and left for about an hour, changing water several times. A tray of water used on a titubator is efficient. The water must be changed often, and the time required is about three-quarters of an hour, or longer. When several negatives are being made, it is advisable to use a washing box similar to the fixing box. (Fig. 74.)

Drying.

The next, and the last step in the making of the negative, is to dry it. The plate should be set on edge. Drying should take place in a clean atmosphere, so that no dust or soot will fall on and stick to the coated surface

*"Running water" is much to be preferred, as the friction or movement of the water is a great factor in cleansing the plate. After a few months, if plates show cloudiness, or a metallic lustre is observed, this means that the plates were not thoroughly washed. It is even advisable, after washing, to rub the surface of the film side with clean, wet cotton, holding the plate under a faucet during the act.

of the negative. Plate racks (Fig. 75) may be used, but are not a necessity. The plate may be set on edge at an angle of about 95 degrees by simply leaning it up against some perpendicular wall. (Fig. 76.) Drying requires several hours. It may be hastened by placing the negative in a breeze. By immersing the negative in a mixture of formalin and alcohol, then placing it in the breeze of an electric fan, drying will be very materially hastened. The use of the formalin and alcohol some-

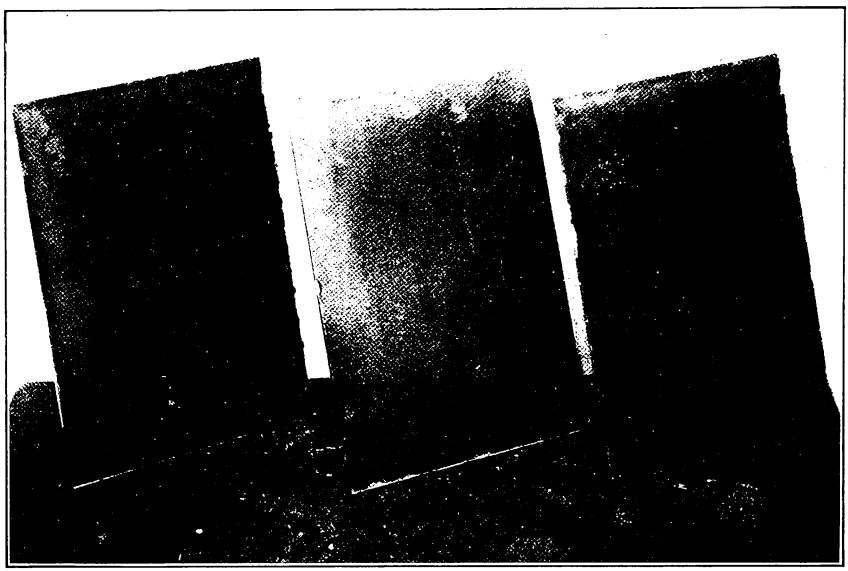


Fig. 76. Negatives leaning against perpendicular wall, drying.

times causes spotting and blurring of the negative. If all the salts of the fixer are not well washed out of the emulsion, it will not dry promptly, but will become rough and sticky, and, when finally dry, it will be full of little holes.

Summarizing the making of the negative, it consists of exposing, developing (washing—mere dipping in water), fixing, washing, and drying.

If the negative when finished is very dark, so dark that parts of the image are lost, the plate was either overexposed, or overdeveloped, or both. I prefer usually to say that it was overdeveloped, for even if it had been exposed unnecessarily long, this mistake might have been corrected by leaving it in the developer a shorter length of time. If the negative is almost entirely transparent and the image can hardly be seen, it is due to underexposure, or underdevelopment, or both.

Reducers.

The mistake of overexposure or overdevelopment can be corrected to an extent by the use of a "reducer."

The following solution is a reducer:

*A. Water	16 ounces	(480 c.c.)
Hyposulphite of soda	1 ounce	(30 grammes)
B. Water	16 ounces	(480 c.c.)
Potassium ferricyanide	1 ounce	(30 grammes)

Mix 8 parts of solution "A" and one part of solution "B," and use in subdued light.

The negative can be placed in this solution directly after fixing, without washing. Or it may be washed—it makes little or no difference. If a dry negative is to be reduced, it must be soaked in water for at least half an hour before placing it in the reducer. When sufficiently reduced, wash thoroughly for about three-quarters of an hour, then dry. The work of reducing may be done in any light.

When not in use keep solution "B" protected from the action of light. Remember that this solution is one of the most powerful poisons known. Handle it with extreme caution. The mistake of underexposure cannot be corrected to an appreciable extent by any means.

Intensifier.

The mistake of an underdevelopment can be corrected to an extent by the use of an "intensifier."

After having fixed the negative, wash it well in running water for about thirty minutes or longer, then place in the following solution:

Mercuric Bichlorid	200 grains	(13.3 grammes)
Potassium Bromid	120 grains	(8.0 grammes)
Water	6½ ounces	(195 c.c.)

Keep the plate in this solution a short time, when it will be observed to be bleached uniformly white; the longer the negative is bleached the denser it will become. It is again thoroughly washed under a spigot for a few minutes and then blackened in the following solution:

Sodium sulphite	1 ounce	(30 grammes)
Water	4 ounces	(120 grammes)

Or

Ammonia	20 min.	(1 c.c.)
Water	1 ounce	

It now being blackened, the negative is again washed, then dried. Intensifying should be done in a subdued light—not in bright daylight.

An old negative, one which has been made for some time, may be intensified by first soaking in water, then following the technic given.

Prepared reducers and intensifiers, with directions for their use, may be purchased at any photographic supply house.

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*"Electro Therapeutics and Roentgen Rays," Kassaban.

While reducers and intensifiers have their place in dental radiography, they are used only to correct mistakes, and they do not entirely correct the mistakes. It is usually expedient to make a new negative rather than to attempt to reduce or intensify a faulty one.

Round transparent spots on the negative are caused by air bubbles, or air "bells," as they are called, attaching themselves to the emulsion side of the plate while in the developer.

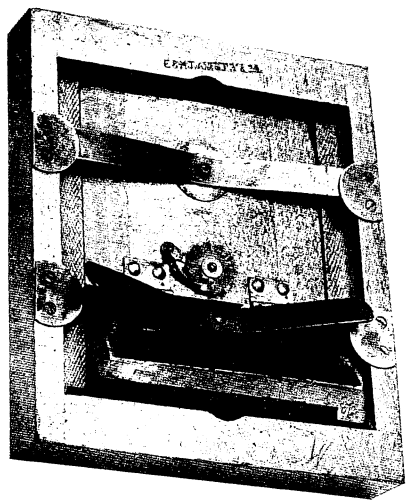


Fig. 77. A printing frame.

Spots of irregular size and character appearing on a negative are due often to the use of an old developer. In radiographic work, where the appearance of a spot may determine a diagnosis, it is to be hoped that fresh developer will always be used. By fresh developer I mean developer not, at most, over a month or so old, having been kept while in stock in a filled, tightly stoppered bottle, and free from all scum and sediment. A developer containing pyrogallic acid disintegrates so rapidly that it must be used immediately after mixing—it will not keep at all. "Pyro" developers stain the hands badly.

Positive Prints.

When the negative is dry we are ready to make the positive pictures. The pictures are made on sensitized paper, a very fine grade of white paper, one side of which is coated with a silver salt somewhat as plates and films are coated. These papers sell under such various names as Velox, Cyko, Artura, and Azo, and may be purchased in

any size, put up in light-proof packages. Papers are not as sensitive as plates and films, and an orange instead of a ruby light may be used in the dark room.

Place the negative, emulsion side up, in the printing frame (Fig. 77). Place a sheet of paper, sensitive side down, over the negative, and close printing frame. The sensitive side of the paper may be determined by observing that the paper curls slightly toward it; or by biting a corner of the paper, when the sensitive side will stick slightly to the teeth.

To make the exposure now, either artificial or daylight may be utilized. I find that the most uniform results may be obtained by the use of the electric light. Before making the exposure be sure that the balance of the paper in the package is well protected against the light. Hold the printing frame so the light will shine through the negative and strike the paper. It is not necessary to hold the printing frame perfectly immovable during exposure. The time of exposure varies greatly according to the density of the negative; the denser the negative the longer the exposure must be. Some idea of the time of exposure necessary may be learned from the directions enclosed with the paper. To make the print for Fig. 71, a 16 c.p. electric light was used, holding the printing frame 8 inches from the light and exposing the paper—Azo—3 minutes.

Development of Prints.

With the 16 c.p. light turned off, in the orange light, the paper is now removed from the frame. As with the plate there is not the slightest change in the appearance of the paper after exposure, but the image is there, it is latent, it needs only to be developed.

The developing formulæ for papers are, broadly speaking, the same as for plates. It is very important that the developer for paper be freshly mixed, for the slightest discoloration of the bath will soil the paper. It is not desirable to save the developer used to make the negative and use it again for the paper. It is too liable to cause discoloration of the print. "Pyro" is a very poor developer for paper.

Immerse the paper quickly, sensitive side up, gently passing the tips of the fingers over the surface, to hasten development by agitating the developer, and to keep the paper submerged. As soon as the image appears as desired, transfer it to clean water, then quickly into the fixer. (It is kept in the water but a moment or so.) If, when placed in the developer, the image comes up so quickly that it gets too dark before it can be transferred to water and fixer, it has probably been overexposed. Shorten the time of exposure, and if the image still comes up too quickly, dilute the developer. If the whites of the prints come up gray, add a few drops of a 10 per cent. solution of bromide of potassium to the developer.

Any number of prints—pictures—may be made from a negative.

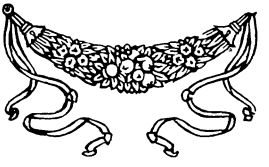
The fixing bath for prints is the same as for plates, but the bath used to make the negative should not be saved and used again for prints. It might discolor them.

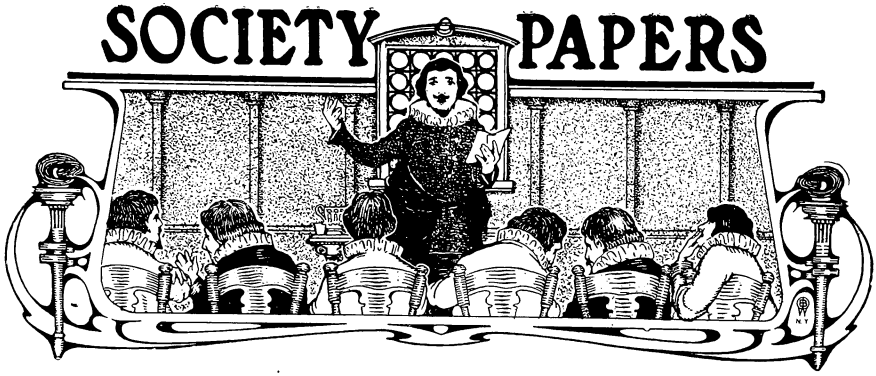
Allow prints to remain in the fixer 15 to 20 minutes. This dissolves out the unaffected silver.

Next wash print in running water for an hour. No visible change occurs in the print from the time it leaves the developer. Fixing and washing are done to make it permanent. The temperature of the developer, fixer, and water should be the same as for plates, to obtain the best results.

When thoroughly washed remove the prints from the wash water and place on a piece of clean glass face down one on the other, and press out the water. Then lay them out separately on a frame, covered with cheese cloth. The cheese cloth being very thin, allows the prints to dry on the side next the cloth as well as the upper side.

When dry the prints may be mounted on cardboard.





Regarding Dental College Work.

By George Edwin Hunt, M.D., D.D.S., Indianapolis, Ind.
Dean of the Indiana Dental College.

Read before the Second District Dental Society, February, 1911.

For many years, whenever things lag a bit in a dental meeting, or even when they do not lag, it has been the customary and proper thing for some one to arise majestically, assume a Websterian attitude, and hand the dental colleges a verbal solar plexus jolt. Sometimes this is a part of the printed program and the jolter has committed his jolts to paper, but more often it occurs without relevance to the subject before the house—is "accidental," as we say in bacteriology, and lugged into the discussion by the ears. But whether sporadic or epidemic, accidental or premeditated, it is ever a popular thing with some, and usually productive of much oratory and violent handling of that peculiarly fragile article, the Truth. Are prices low in the community? Damn the dental colleges! Is the nimble advertiser abroad in the land? Curses on the dental colleges! Does the profession fail to evince desired enthusiasm regarding certain pet theories of yours? Down with the dental colleges! Have you a boil on the end of your nose? Confusion to the dental colleges! The dental colleges are the little boy in the cartoon, and certain members of the profession are "Billy," who is forever crying: "Now look what you went and done!"

Papers on Dental Education.

In the six years ending December, 1908, there were over one hundred and forty articles dealing with dental education published in the *Cosmos,* Items of Interest, *Review* and *Digest.* This means prepared papers and does not include the innumerable times when some member has caught the eye of the chairman, arisen and said: "Mr. Presi-

dent: In regard to the subject under discussion, 'The Infrequent Occurrence of Locomotor Ataxia Among the Children of the Poorer Classes and Its Relation to Malposition of the First Permanent Molar,' permit me to remark that if the dental colleges of this country were to——," and-so-on and-so-on *ad libitum,* and I am almost tempted to add, *ad nauseum.* Many of the articles above mentioned are in criticism of the colleges, their curricula, their standards, their teaching methods and their rules. Some of them are sane criticisms based on existing deficiencies, but in the great majority of cases the writer or speaker is unqualified by either knowledge or experience to hold a brief either for or against the institutions criticized. It is the purpose of this paper and of my visit to you to answer some of these criticisms and to try to convince you that even the teachers in dental colleges are often intelligent, occasionally conscientious and sometimes almost progressive.

Colleges Not Perfect.

Permit me first to place before you with all the emphasis at my command the thought that no dental college teacher worthy of the name will for an instant contend or even think that the colleges are perfect. We are at least too intelligent for that. All of us in dental college work are aware of existing deficiencies; perhaps better aware of them than our critics, because it is our business to be aware of them. Courses which approached the ideal ten years ago are far from satisfactory to-day, and the courses upon which we pride ourselves to-day will be *passe* or obsolete to-morrow. We know that. None know it better. On the day when any teacher, whether in common, high, professional or other school, comes to think his work to be without a flaw and his course perfection, that day has his usefulness as a teacher ceased. The teacher of Greek or Latin or geometry or history has to concern himself with new methods of imparting old facts only. Practically speaking, there are no new facts coming to light in these and many other subjects unscientific in character. But the teacher of any subject taught in a dental college must not only keep abreast of modern teaching methods, but must also keep constantly informed concerning the progress of knowledge in that branch. Excepting general anatomy, whose possibilities have been about exhausted by the investigator, no subject in the dental college curriculum is fixed—is completed. In all others investigation and research are constantly bringing new facts to light and throwing new light on old facts. The dental teachers are aware of this and realize fully that perfection in teaching is an even more remote possibility with them than with the teacher of a subject in which further information is no longer to be reckoned as a factor. We realize that the college of the future will perhaps differ as much, in matter presented and in the manner of its presentation,

from the college of to-day as the college of to-day differs from that of twenty years ago. We know things are not perfect. You do not have to prove it, for we admit it. Things were not even perfect in Eden, if you will remember. There was one tree of Hood River Valley apples that created friction. We do not claim that the colleges are perfect, but we do claim that they are moving toward the goal of everyone's desires about as rapidly as you can reasonably expect.

Progress Made by Dental Colleges.

In this connection permit me to make the assertion that in the past twenty years the dental colleges in America have advanced more rapidly in manner and method of teaching than any other line of teaching institutions you can mention, with the possible exception of technical schools, whose progress has been equally remarkable. You must remember that we had to make a course, write text-books for it and train its teachers; quite an undertaking, it seems to me. But I will even go further than the above and make the assertion that the colleges in their teaching have outstripped the bulk of the profession itself; that the graduates of ten to twenty years ago have not kept pace with the colleges and are not on the same scientific and technical plane as are the graduates of to-day. If you doubt this assertion look about you. You who are here before me to-night have no doubt all kept up with the progress of the art of dentistry in the past decade; many of you have no doubt also kept abreast of the advances in the science of dentistry in that same time. But you are picked men. The very fact that you are members of this society and are here to-night proves that. But if those of you here to-night will interview your classmates of ten to twenty years ago concerning their methods of practice you will find the majority of them about where they were when they were graduated, and most of them are not nearly so well informed scientifically as they were when graduated. The colleges, as is right and proper and to be expected, are and have been leading the profession for many years.

The College of the Past.

Let us draw a mental picture of the dental college of the past; a picture that will readily be recognized by you who were students twenty years or more ago. It is a few minutes before nine o'clock in the morning and the students are gathered together in the "mechanical" laboratory or in the assembly room. The only person with authority in the building is the janitor, and his authority is strictly limited by the tolerance of the students. My Lady Nicotine is obtrusively in evidence in the form of pipe tobacco, cigars, cigarettes, fine cut, plug and killikinick. Some one audibly wonders whether Professor Robinson will be

present to fill the nine to ten hour, but as all present are aware from past experience that it is an even bet, no great curiosity or enthusiasm is elicited. At nine-thirty Professor Robinson bustles up the steps, the janitor unlocks the lecture room door and both classes file into the room. In a minute, without a roll call, the Professor is deep in the mysteries and abstrusities of the great value of the essential oils in the treatment of putrescent pulp canals, or the merits and demerits of the Timme glass inlay. After a protracted monologue of almost twenty minutes the Professor looks at his watch, murmurs something concerning an engagement at his office at ten o'clock and retires precipitately, leaving the janitor again monarch of all he surveys within the previously mentioned limitations. The morning languor and fatigue having been partially dissipated by the restful monologue of the departed professor, the boys turn to craps and pitching pennies at a crack for mental exercise. Four ambitious youths form a quartette and execute, literally, a popular ballad with barber shop minor effects in the refrain.

The ten to eleven hour is unfilled because Professor Bigosh has an emergency case—a new patient dropped into his office. The lecturer for the eleven to twelve hour arrives on time, but can only stop a few minutes, because the janitor comes to him with a telephone message from his office girl that Mrs. Jones has had falling of a filling and is at his office wanting to know what he is going to do about it.

The college infirmary is open from 1:30 to 4:30 p. m. and a gentlemanly demonstrator is always in attendance—if it is convenient for him to leave his private practice. If it is not, the students demonstrate for each other, and Heaven help the patients! By five o'clock most of the boys are over in the nearest poolroom giving vent to their desire for a liberal education by working out geometrical problems with sixteen balls and a cue.

The above is not a caricature. Let your memories run back to the colleges of twenty years ago with their meager equipment, lack of discipline, lack of executive control, two terms of five months each, limited curriculum and teachers untrained and unfitted for their work. Contrast them with our modern colleges, with equipment representing thousands of dollars, guided and controlled by men of decided executive ability, with trained teachers many of whom devote all their time to college work, with three sessions of thirty-two weeks exclusive of holidays, and tell me, if you can, what branch of educational endeavor has made the same degree of progress in the same length of time. In all the world dental college work is only seventy years old, the Biblical threescore and ten, but look at what has been accomplished in that time. And note, please, that the greatest of these advances have been made in the past twenty years.

Are Dental Teachers Incompetent?

No right-minded person objects to just criticism. Just criticism arouses the energies, stimulates mentality and evokes naught but good in the criticized. But if some of the rabid critics of our present dental educational system are correct, our dental teachers must be either grossly incompetent and of intelligence below the average in the profession, or else wilfully negligent and dishonest in that they fail to put forth their best efforts in imparting instruction to their students. Are the teachers in our dental colleges incompetent? Are they below the average in intelligence in the profession? Are they willfully negligent or educationally dishonest?

Competency in teaching is a relative matter. Compared with Charles Norton Elliott, Benjamin Ide Wheeler, David Starr Jordan or Mark Hopkins, of whom it was said that "a log with Mark Hopkins on one end and a student on the other would constitute a university," our dental teachers might be held to be incompetent, but when compared with the great body of the rank and file of educators in universities, colleges, technical and high schools, they are far from incompetent. On the contrary, anyone familiar with the papers and discussions of the National Association of Dental Pedagogics during the past sixteen years will be compelled to acknowledge that the earnestness, care and skill in handling dental educational matters and methods as exploited in that body is not excelled by any body of educators in the country. For your enlightenment I will cite a very few of the papers presented before this Institute in the past few years:

Operative Technics, Thomas E. Weeks, Minneapolis, Minn.
Prosthetic Technics, George H. Wilson, Cleveland, Ohio.
Metallurgy Technics, C. L. Goddard, San Francisco, Cal.
Instrumentation Technics, David M. Cattell, Chicago, Ill.
Dental Pedagogics, Edward C. Kirk, Philadelphia, Pa.
Teaching Dental Histology, Frederick B. Noyes, Chicago, Ill.
Teaching Oral Surgery, G. V. I. Brown, Milwaukee, Wis.
Teaching Dental Anatomy, A. E. Webster, Toronto, Canada.
Teaching Dental Metallurgy, J. D. Hodgen, San Francisco, Cal.
Teaching Prosthetic Dentistry, George H. Wilson, Cleveland, Ohio.
Teaching Bacteriology, W. R. Blue, Louisville, Ky.
Teaching Physical Diagnosis, J. M. Patton, Chicago, Ill.
Teaching Embryology, I. Norman Broomell, Philadelphia, Pa.
Teaching Applied Physics, G. V. Black, Chicago, Ill.
Teaching General Anatomy, L. C. Borland, Chicago, Ill.
Teaching Orthopedic Dentistry, Calvin S. Case, Chicago, Ill.
Teaching Anatomical Arrangement of the Teeth, B. J. Cigrand, Chicago, Ill.
Teaching the Artistic Elements of Prosthetic Dentistry, A. O. Hunt, Omaha, Neb.

Teaching Physiology, C. M. Wright, Cincinnati, Ohio.
Teaching Orthodontia, S. H. Guilford, Philadelphia, Pa.
Teaching Operative Dentistry, C. N. Johnson, Chicago, Ill.
Teaching Soldering, Ellison Hillyer, Brooklyn, N. Y.
Teaching Bacteriology and Pathology, George W. Cook, Chicago, Ill.
Teaching Materia Medica and Therapeutics, John P. Buckley, Chicago, Ill.
Teaching Filling Teeth with Porcelain, John Q. Byram, Indianapolis, Ind.
Teaching Dental Anatomy, Histology and Embryology, Carl D. Lucas, Indianapolis, Ind.

With two exceptions all of the above are dentists. Are not these men competent to outline courses of study and methods of teaching those courses? If others are markedly more so, will some one please arise and tell us who they are? If C. N. Johnson is not competent to teach teachers to teach operative dentistry, if I. Norman Broomell is not competent to teach teachers to teach embryology, if J. D. Hodgen is not competent to teach teachers to teach metallurgy, where in the dental profession *will* you find men of competency for that work? Among the dental college critics? I believe and here assert that the dental college teachers average as high in competency as the teachers in other branches of educational endeavor.

As to whether it has any significance or not, your guess is as good as mine, but it is a fact that one of the most violent and persistent critics of the dental colleges and their teachers was himself very anxious to become one of that benighted band a few years ago, but could find no college that desired his services. His ambition, no doubt, was to leaven the whole educational lump and give it an uplift in the direction in which he claims a monopoly of scientific light.

Are the men engaged in college work below the average in intellect in the profession? Let us see. Nearly all the books published in many years treating of the science and the art of dentistry have been written by college teachers. In their proportion to the remainder of the profession college teachers are far in advance in the quantity and quality of their contributions to current dental literature. Of the more widely circulated dental magazines the *Cosmos, Brief, Summary, Western Dental Journal, Review, Register* and *Oral Hygiene* are edited by men either at present actively engaged in college work or ex-college teachers. The editors of ITEMS OF INTEREST, *The Digest* and *The Pacific Dental Journal* have never been connected with colleges in a teaching capacity, I believe.

ITEMS OF INTEREST

Here is a fairly complete list of books pertaining to dentistry published in the United States in the past ten years:

American Text Book of Prosthetic Dentistry, Charles J. Essig, 1900.

American Text Book of Operative Dentistry, E. C. Kirk, 1900, contains contributions from eighteen men, sixteen of them college teachers.

Dental Metallurgy, Charles J. Essig, 1900.

Principles and Practice of Filling Teeth, C. N. Johnson, 1900.

Artificial Crown and Bridge Work, George Evans, 6th edition, 1900.

Dental Electricity, L. C. Custer, 1901.

Interrogatories on Dental Metallurgy, J. H. Beal, 1901.

Dental Medicine, F. J. S. Gorgas, 7th edition, 1901.

Oral Surgery, Stewart LeRoy McCurdy, 1901.

The Internal Anatomy of the Face, M. H. Cryer, 1901.

Questions and Answers, F. J. S. Gorgas, 1901.

Principles and Practice of Operative Dentistry, John S. Marshall, 1901.

Orthodontia, J. N. McDowell, 1901.

Anatomy and Histology of the Mouth and Teeth, I. N. Broomell, 2d edition, 1902.

Dental Materia Medica, Therapeutics and Prescription Writing, E. H. Long, 1903.

Success in Dental Practice, C. N. Johnson, 1903.

Irregularities of the Teeth and their Treatment, Eugene S. Talbot, 1903.

Principles and Practice of Crowning Teeth, Hart J. Goslee, 1903.

Injuries and Surgical Diseases of the Mouth, Face and Jaws, J. S. Marshall, 1903.

Dental Pathology and Dental Medicine, G. W. Warren, 1903.

Anæsthesia and Anæsthetics, J. M. Patton, 1903.

Dental Pathology and Therapeutics, H. H. Burchard, revised by Otto E. Inglis, 1904.

Orthodontia and Orthopœdia of the Face, V. H. Jackson, 1904.

Manual of Chemistry, W. Simon, 1905.

Orthodontia, S. H. Guilford, 1905.

Mechanical Dentistry and Metallurgy, G. W. Warren, 1905.

Notes on Dental Porcelain, V. Walter Gilbert, 1905.

Developmental Pathology, Eugene S. Talbot, 1905.

Chemistry for Dental Students, H. Carlton Smith, 1906.

Malocclusion of the Teeth, Edward H. Angle, 1907.

Operative Dentistry, G. V. Black, 1908.

Operative Dentistry, C. N. Johnson, 1908, contains contributions from seventeen men, fourteen of them college teachers.

Dental Orthopœdia, Calvin S. Case, 1908.

History of Dental Surgery, Koch and Thorpe, 1909.

Dental Materia Medica and Therapeutics, Herman Prinz, 1909.

Modern Dental Materia Medica and Therapeutics, John P. Buckley, 1909.

Now, here is a list of thirty-six books, comprising, I believe, all the books pertaining to this subject published in the United States in the past ten years, and the writers or editors of all but two, those written by Dr. Eugene S. Talbot, are or have been college teachers. Surely the writers of the literature of dentistry cannot be below the average in intellect in the profession. The proposition that they are would be absurd.

Are Teachers Negligent or Dishonest?

Are the teachers in dental colleges wilfully negligent or educationally dishonest? Anyone knowing them as a class will certainly repudiate such a suggestion. Instead of being negligent or dishonest in their work, the history of every college contains stories of men who have sacrificed worldly advantage to the educational cause. In my own experience I have seen scores of instances where men have filled their lecture engagements at colleges promptly and intelligently, year after year, at a financial sacrifice to themselves. I have seen many men give their time to infirmary demonstration as faithfully and regularly as though it were their sole means of livelihood, when every half day spent in the infirmary was not only a direct money loss, but a distinct handicap in the building of a practice. I have seen men devote all of their time to educational work for years for salaries that did not begin to approximate their probable earning powers in a private practice. These things have been done and are being done. These men are not negligent or dishonest. They are honest, upright, honorable men and are doing a great service to humanity in a big, broad way. Much stress is sometimes laid upon the fact that they receive pay for their services, but why should they not? The laborer is worthy of his hire. I know of precious few college teachers with independent incomes. Even the teachers of the Gospel draw their stipend for doing so, and it is right that they should.

The Teaching of New Methods.

The cry is often raised that the college is neglecting opportunities. The profession is all excited over a certain method or certain theories, and the colleges are not exploiting it or them as their enthusiastic admirers think they should. It is certainly patent to any thoughtful observer that conservatism on the part of the teachers in the profession is an excellent quality and makes for great good. "Be not the first by whom the new is tried, nor yet the last to lay the old aside," is a good motto for the teachers of the youth of the land. Did the college teachers accept as perfect each new method, new appliance, or new thought advanced, without final proof or confirmation by experience, they would be but sorry teachers indeed. The student is prone, and rightly so, to believe that what he hears from his professors is the truth, the whole

truth and nothing but the truth, and it behooves his teachers to foster that idea in the only practical way possible, namely, by being careful to tell him as near nothing but the truth as is consistent with human fallibility. Many members of the profession are ever ready to grow overenthusiastic over new methods or new appliances. That is why practically every dental office has a junk pile established and maintained for the purpose of preserving the foolish things we buy but never use. Some of you may recall certain gentlemen who asserted in loud and clarion tones some six or seven years ago that porcelain is the best filling material for every cavity that presented. I do not seem to hear the echo of those voices quite so clearly to-day. Some of you may even have heard certain practitioners say that the modern methods of making cast inlays have relegated their gold pluggers to the ash barrel, or that junk pile, forever. Let us hope it was the junk pile, for then it will not be difficult for the owner to resurrect them later on. Such a temperament and such impulsiveness would seriously mar the usefulness of a teacher.

Furthermore, the college often fails to lay great stress on a method in which the profession is, at least temporarily, interested, because doing so would mar the education of the student in other and more important lines. For illustration, every dental student for the past two or three years has been crazy to make cast gold inlays, just as, twenty years ago, they wanted to do nothing but crown work. Now cast inlays are all right, but every inlay they make means a corresponding loss in gold-working practice, and that is something no student can get a surfeit of. So, in the school with which I am connected the student gets the greater part of his inlay practice in the technic room. Inlays must be emphatically indicated in the operatory before they are inserted. I would rather have a student leave the college a good gold foil worker and a poor inlay worker than the reverse of that. Whatever the future may have in store for us, in my opinion the student of the present should be thoroughly grounded and trained in the insertion of good old gold foil fillings like father used to make. The student is much too ready to follow what seem to him to be easier methods of practice for the colleges to encourage him in them. For this reason all good schools should, and do, insist on pupils giving the major portion of that time devoted to practical work, to the development of that dexterity and skill in the older and proved forms of operative endeavor, that will make it easier for them to adopt the newer methods when these latter are indicated. I do not mean to give the impression that instruction in casting inlays is neglected, for that is not true, but I do want to fix in your minds the fact that conservatism more befits a scientific teaching institution than radicalism, and that the former will do more good for the student than the latter.

National Association of Dental Faculties.

I cannot pass over a matter that I touch upon with great reluctance, the unjust criticism of colleges by certain college men for ulterior purposes, the ill birds who attempt to foul their own nests. A paper read before the National Dental Association at Denver and printed in a recent number of the *Cosmos* typifies this fortunately rare variety of mentality. In it the author maligns all colleges except the one favored by his personal efforts, states his belief that State boards are "commercial enterprises" conducted by men of inferior attainments, and attempts to belittle the work done for dental education by the National Association of Dental Faculties. A broad-minded man and a fair-minded man could not have written such a paper. It is not seemly for any school man to claim all educational virtue and ability to be centered in the institution with which he connected, nor is it true, no matter what the institution. To build up an enterprise, whether educational or otherwise, by tearing down existing similar institutions is seldom successful, and always economically wasteful. No factor has done a tithe as much for the advancement of dental education as has the National Association of Dental Faculties. And if memory serves me right, it was active in doing good many years before the comparatively recent date on which the writer mentioned above found his way into educational ranks. It has ever been the one agency by which concerted action in increasing the efficiency of college work could be secured, and the history of the National Association of Dental Faculties is the history of the progress of dental education in the past twenty-seven years.

Many minor criticisms of dental colleges occur to me, criticisms usually based on misapprehension or ignorance, but life is too short and time too valuable to recite them here. However, there are two phases of the matter often vehemently urged which I shall be pleased to review if you will be patient with me.

Ethical Training in Dental Colleges.

It is a common thing for the dental college critic to blame the colleges for the existence of the advertising dentist and the advertising evil. The claim is made that the student does not receive the proper ethical training in school, but is, on the contrary, impregnated with unethical microbes by the teachers. In view of the fact that an unethical man on a dental college faculty is absolutely unknown, the criticism would seem to fall of its own weight, but as it is iterated and reiterated, let us look into the matter a little. The writer spent some years in municipal reform work at one time and early learned the axiom regulating the work of all true and all successful reformers, namely, that men cannot be reformed by laws. You cannot legislate virtue into

a man nor into a community any more than you can religion. The history of the world is one long attempt to do so and the record is one of continuous failure. You may pass all the laws you please regulating the liquor traffic, the speed of automobiles, or whatever it may be that you wish to reform, but the reformation will not come with the passage of the law except as the law is acceptable to the individual. You have a law in this State that prohibits one person from killing another, and yet, to quote Koko in the "Mikado," "I have known it done." Any lawyer will tell you that the statute books of every State in the Union are crowded with laws that are absolutely dead letters. Some laws, like the law against murder, have a deterrent effect, no doubt, because of the severe penalty which follows their violation. Other laws, the violation of which is only a misdemeanor, are observed or not, at the option of the individual. If he has respect for laws as laws he will obey them; if he is not naturally law-abiding he will obey them or not, according to his degree of indifference to police interference. The previous training of the individual, or custom, plays a large part in the enforcement of many laws. For instance, in Indianapolis we have an ordinance prohibiting spitting on the sidewalk. Such an ordinance was unnecessary for my regulation, for it never was my custom to spit on the sidewalk. However, many persons do spit on the sidewalk. All of us who do not do so will agree that spitting on the sidewalk is an obnoxious, unsanitary proceeding and that those persons who outrage decency to the extent of doing it should be arrested and fined. But the fellow whose custom it is to spit on the sidewalk still believes in his right to do so even after the passage of the law, and continues to exercise his fancied prerogative with moist regularity. Passing the law did not reform him a bit; he considers the law a foolish one, and as the danger of punishment is remote he "takes a chance" and ignores it.

Ethics is defined as "the science of right conduct and character; the science which treats of the nature and grounds of moral obligation and of the rules which ought to determine conduct in accordance with this obligation; the doctrine of man's duty in respect to himself and the rights of others."

A code of ethics is "a particular system of principles and rules concerning moral obligations and regard for the rights of others, whether true or false; rules of practice in respect to a single class of human actions, as medical ethics, dental ethics, etc."

A law is a rule or collection of rules prescribed under the authority of the state or nation, and "it is essential to the idea of a law that it be attended with a sanction; or in other words, a penalty or punishment for disobedience."—Alexander Hamilton. The dental code of ethics does

not constitute a law, because its inception does not permit of a legal penalty or punishment for disobedience. It is, as the definition states, a rule of practice for the members of the profession and may or may not be observed without incurring risk of legal punishment, at the option of the individual. That being the case, the observance of the rule of practice will depend on the character of the individual and on the influence of the college on that character while he is a student. The inherited character of the student, a powerful factor, and the character acquired in the years preceding his college course, almost equally powerful, are beyond the power of the college to influence. So, if the college expounds the dental code of ethics to him fully, in addition to giving him the object lesson of daily contact with ethical practitioners, both of which it does, it has about reached the limits of its resources in that regard and should not be charged with the after derelictions of that student, unless you are also willing to credit to its good influences the much larger number of graduates who are not unethical. Some years ago one of the colleges in your State required each candidate for graduation to take the Hippocratic oath. In my opinion that was an ill-advised move. Taking the oath would not influence the future actions of those who could not be so influenced by an ethical atmosphere in the institution, and a violation of it after taking it leaves the student in a worse state morally than if he had never heard of it.

So, if the state or nation is unable to inculcate social ethics in all instances, with the assistance of laws the violation of which brings a penalty or punishment for disobedience, how can the actual colleges be expected to inculcate dental ethics in all instances with *no* legal authority to back them? It is, again, a question of the individual.

Unethical Practitioners Reclaimable.

I want to emphasize that point—that ethical or unethical practice is a matter of individuals, their inherited and acquired character. You cannot reform unethical practice by treating unethical practitioners as a body; you cannot reform it or them with laws, even if you could get them, which you cannot; and you certainly cannot reform it or them with rules. Wholesale denunciation of unethical practitioners is worse than futile. In all efforts to abate the evil the individual problem must be faced if good is to be accomplished. Some unethical practitioners are irreclaimable; we will all have to admit that. But years of experience in dealing with students and young practitioners in the closest personal relations have brought to my attention many cases of young men forced by stress of circumstances to adopt unethical practices or to work in unethical offices who afterward mended their ways and became valuable members of society. An empty stomach and a lean purse

are not unapt to change the ethical viewpoint. It has been known to develop burglars from hitherto perfectly ethical citizens. The uncharitableness of many so-called ethical men in refusing support and encouragement to the man who has wandered from the straight and narrow path, but who is trying to return, and who, with his feet entangled by the briars and ground vines of the unethical ground onto which he has strayed, is struggling with an awakened conscience to return to the beaten path, is responsible for the continuance of much of this evil. Who are you, or who am I, that we should set ourselves up as the arbiters of the destiny of such young men? I contend that to do less than your best to encourage and support them in their efforts to abandon the wrong and resume the right is as unethical as any act they ever performed. The Pharisee passed by on the other side.

Should Dentists Be Medically Educated?

Another criticism of the colleges frequently heard, and which has crystallized into legislative enactment in the State of Virginia, is that more medicine should be taught in our dental schools or, to take it to the extreme of the Virginia case, that dentists should be medically educated before they enter on the study of dentistry. Now let us consider that.

The stock argument of the extremist in this contention is that as dentistry is a specialty of medicine, no dentist can have acquired his fullest usefulness to his clientele without having obtained in course the M. D. degree. For years the question whether dentistry was a specialty of medicine or not was ceaselessly argued, and, for all I know to the contrary, it may be a subject for contention even yet. But I believe we are practically unanimous now in conceding that dentistry is a specialty of "the healing art," and if the term "medicine" embraces "the healing art" we are medical specialists. Let us agree that we are specialists in medicine, whether the medical men admit it or not, so we may pass on to the argument as to whether the acquirement of the degree of Doctor of Medicine under the existing conditions of medical college educational work will improve our usefulness or not. For that, I take it, is the real point at issue; to improve our usefulness. I know it has been argued that the M. D. degree will "improve our status" in the community in which we live, but that talk is folly, and fit pap for fools only. A man's status in his community is fixed by his ability, his character, his culture and his personality. I know several colored barbers whose standing in their community is better than that of some white physicians. Physicians and laymen are both quick enough to recognize and acknowledge true merit wherever they see it, and all the letters in the alphabet tacked on to the name of a sap-headed incompetent will not bring him the respect

of the community in which he lives. Degrees do not honor the man; the man either honors or dishonors the degrees.

I am a graduate of medicine and obtained my degree in course, the same as any other graduate. I acquired a large amount of interesting information in my medical college career, but I can honestly say that the great mass of it has been of no practical benefit to me as a dentist. The location, feel and anatomical relationships of the uterine os, for instance, may be matters of detached interest, but they are of no more practical value to the dentist than they are to the rhinologist or aurist or layman. I learned to differentiate between an occipito-posterior and an ordinary face presentation in parturition, but have never had occasion to put that knowledge in use in twenty years, although married.

Medical college training is at present undergoing a gradual, but certain, evolution. Medicine, even more than dentistry, has been growing in all directions. The practice of medicine has been already highly specialized and is yearly becoming more so. This specialization was inevitable, and is due to the constant additions to the sum of the knowledge concerning diseased conditions and their cure. No one man, nor any half-dozen men, can hope to acquire and put into use all the present knowledge of medicine. It is beyond the capabilities of the human intellect. And all the time the histological, chemical, bacteriological and pathological laboratory workers are constantly adding to this vast store of knowledge by research work, piling up an Ossa on the Pelion of facts already overwhelming the struggling seeker after all medical knowledge. Medical college teachers recognize the futility of their old methods in handling the educational problems of to-day, and the best minds among them are constantly striving for the correct solution of the problem confronting them. The medical graduate of to-day is superficially educated. He has a smattering of many things and a perfect knowledge of none.

In medicine, and to a lesser degree in dentistry, we have to-day two types of colleges: One type whose graduates have not attained the highest degree of scientific knowledge, but who are well-equipped for dealing with the bodily ills of mankind as found in the sick-room; the other type of college graduates, students minutely trained in laboratory methods and thoroughly well-versed in the latest discoveries of the research workers and their methods of making them, but who are not nearly so competent to practice medicine as the graduate from the former institution. In dentistry the graduates of this latter type of college—for we have them, as I have said, in a lesser degree—pass fine written State Board examinations in the scientific branches, but cannot anchor a filling in a tooth. They may be able, perhaps, to differentiate between a giant and a round-celled sarcoma with the microscope, but they cannot

find the mesial canal in a lower molar with a broach. Now both of these types of college are indispensable, in medicine at least. The latter type, in medicine, is the outgrowth of the great mass of scientific information accumulated in the last three or four decades by means of laboratory work. The evil in both types lies in the fact that they have not been generally recognized and acknowledged as types as yet. Students enter individual colleges without the slightest consideration of what effect the methods of training in that institution will have on their particular capabilities. Many students are not temperamentally nor mentally qualified for research work, but are so fitted for the practice of medicine, and *vice versa.* I predict that it will not be long before a sharp line will be drawn in the medical college world. On the one hand, we will find a very few institutions confining their efforts to educating students for laboratory research work, and making no attempt to graduate sick-room practitioners. As the institution that approaches most nearly to that type at the present time I would cite Johns Hopkins. The men who attend these institutions will be men who have displayed marked ability and inclination for laboratory work. From the portals of these institutions will come the laboratory men for our health boards. And on the other hand will be the bulk of the medical colleges whose work shall be the equipment of their students for the combatting of disease in the sick-room. The first type of college will graduate the discoverer of "606," and the second type will graduate its administrators.

So you see the medical colleges are facing a serious problem to-day. They are confronting the fact that while the practice of medicine has become highly specialized, they are not properly training their students in any one specialty. It is impossible for them to do so owing to the vast amount of knowledge concerning each specialty that has been accumulated. Their students are graduated with an imperfect training in many specialties and a perfect training in none. In view of the cumulative effect of this condition as each year passes, I believe it will be but a short time until those colleges training their students for the practice of medicine will rearrange their curricula to better meet these changed conditions. I believe the medical college of the future will offer, say, two years of a common course for all students, during which general anatomy, physiology, chemistry, bacteriology, materia medica and kindred general subjects will be taught. At the close of this course the student will elect his future course. These elective courses will embrace, for instance, two years, or perhaps more, of special training in the work the student elects as his life work. One course will be for the training of general practitioners, for so long as the smaller towns and the country exist we must have our general practitioners. The candidates for this

course will devote little, if any, time to orthopœdia, gynæcology, ophthalmology, rhinology and many other of the special courses. They will need to have a "working knowledge" of obstetrics and general surgery, but will not receive the amount of training the candidate for specializing in those branches would receive. And the other students will be trained according to the specialty they elect to follow. It is as useless for the student who desires to specialize in rhinology to spend valuable time in loading up his mind with minute knowledge of value only to the genito-urinary specialist as it is for the student who desires to specialize in dental surgery to spend his time taking on a mental cargo of value only to the rhinologist.

Whether such an evolution will lead to the adoption of different degrees according to the course of study pursued is problematical. Personally, I believe it should, for the rhinologist will not have the special training given the obstetrician, any more than the latter will have the special training necessary for the practice of dental surgery, and none of them should occupy any but his own field without returning to the college and properly equipping himself. I surmise, however, that the sentiment attaching to the M. D. degree, a sentiment which has so dazzled some of our contemporaries, will make a change of degrees one that can only be accomplished, as it were, by itself—by degrees.

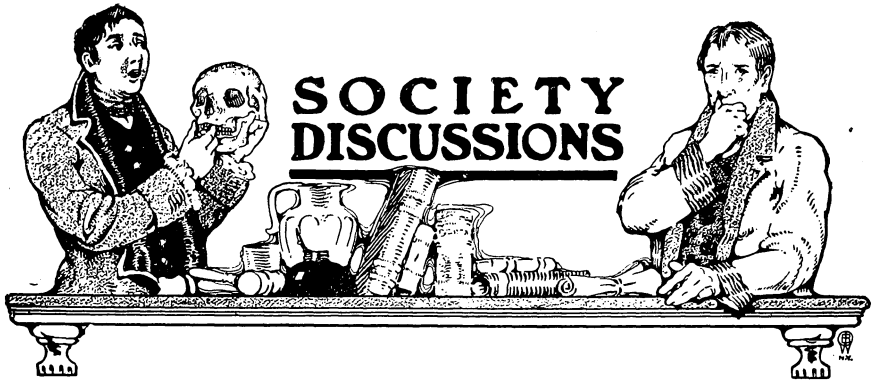
So I conclude that the medical college course in its present evolutionary stage would add but little to the practical usefulness of the dental profession. We would gain nothing by having the profession half-educated medically, and especially if it be at the expense of a thorough dental education, as I think it would. It will be far better if we improve our own courses in the fundamental branches underlying medicine and dentistry and await the developments undoubtedly coming in medical college curricula. Is it too radical to imagine a future college in which all students will take a fundamental course for two years, to be followed by two or more years of specialization leading to various degrees, such as Doctor of Medicine, Doctor of General Surgery, Doctor of Genito-Urinary Diseases, Doctor of Dental Surgery, Doctor of Ophthalmology, etc.?

There is a good deal of pseudo-scientific poppycock about some of the members of our profession. The great bulk of dental practice always has been, is now and always will be confined to the teeth and the tissues immediately contiguous to them, and the dental college that trains its students to give the best services to those tissues is fulfilling its destiny. It is well to have our oral surgeons, and we must have our laboratory research workers who will eventually tell us what causes immunity and susceptibility, and how much the uric acid diathesis really has to do with pyorrhœa, and a host of other important things, but there are some 36,000

dentists in the United States, and nearly all of them can serve humanity best by practicing just plain dentistry—the common or garden variety. At a liberal estimate 1,000 dental specialists can amputate all the tongues that need amputating, close all the cleft palates that will permit of a plastic operation, remove all malignant and benign oral tumors that appear, prescribe for all languid livers, peevish kidneys, overworked colons and other internal furniture, the cause or effect of faulty metabolism alleged to be manifesting itself in the peridental membrane, and which, by the way, ought to be sent to someone who really knows something about it, so that the other 35,000 need not take the time to get that useless special training, but can devote it to perfecting themselves in the work they expect to pursue for their life work. That will keep them busy. I do not seem to recall that all our dental problems are solved as yet.

To conclude, I believe the majority of our dental colleges are doing good work. I believe they are as good as the profession that created them. I do not believe they are perfect, nor have I any hopes that they will ever be perfect, but I have great faith in their advancement along conservative and legitimate lines at least as rapidly as the leaders of the profession advance along those lines. Their past and present history justifies such a belief. As illustrating that our colleges are leading the profession, I call your attention to the fact that courses in oral prophylaxis and dental radiography have been established in many, if not all, of them. Graduates from now on will have a practical working knowledge of those two branches, something that the profession at large decidedly has not.

There may be schools that are not living up to their opportunities. But so are there dentists who are not living up to their opportunities. There is no more justice in condemning all schools because of the dereliction of the few than in condemning all dentists because of the shortcomings of the minority.



Second District Dental Society.

Annual Meeting, January, 1911.

A regular meeting of the Second District Dental Society of the State of New York was held on Monday evening, January 9, 1911, at the Union League Club, Brooklyn, N. Y. The meeting was preceded by a dinner given in honor of the guest of the evening, Prof. G. V. Black, of Chicago, Ill. Two hundred dentists from the Brooklyn, New York and New Jersey societies were in attendance at the dinner, and nearly a hundred more came in time for the paper. The President, Dr. Ottolengui, occupied the chair, and called the meeting to order.

Dr. Ash moved that the regular order of business be suspended. The motion was carried.

President Ottolengui. It seems to me the greatest honor that could have come to me has arrived, and that is, to be able to present to you as the essayist of a society, of which I have the honor to be president—a man who, I may say is the youngest old man in the dental profession—the greatest scientist in the dental world.

He tells me he has kept up his youth by walking, gradually increasing his distance until he has been able to walk fifteen miles. He attributes much of his good health at the present time to taking the prescriptions he will recommend to-night, so as you listen to his paper you may realize that he is the living embodiment of the adage, "Physician, heal thyself!"

I have the honor of introducing Prof. G. V. Black, of the Northwestern University, of Chicago.

Prof. Black, as he rose, was greeted with prolonged applause and cheers, and the diners, under the leadership of Dr. Houghton, sang "For He's a Jolly Good Fellow!"

Prof. Black. Mr. President, Ladies and Gentlemen:—It is a great pleasure for me to meet with this society. I have been to many societies in my time,—though I am but a boy,—but I like the enthusiasm I see to-night. If I had not been fond of this Society, I would not have come so far to speak to you. (Prof. Black then read his paper, which was presented in full in the June issue.)

Discussion on Prof. Black's Paper.

Dr. R. G. Hutchinson, Jr. I was given absolutely no warning in regard to being called upon this evening, and therefore feel that I cannot discuss the subject as I should like to do. I will say, by way of preface, that about all that can be said upon such a paper, by such a man as Dr. Black, is in the way of commendation and endorsement. The more I think of it the more impossible it seems to me to adequately discuss such a paper as has been given to us to-night without having studied it carefully. Dr. Ottolengui has well said that Dr. Black is pre-eminent as a scientist in our profession. Other scientists have made investigations—Miller and others have investigated the cause of dental caries, and have arrived at quite definite conclusions. As far as it goes, it has been interesting and instructive, but has it to any extent altered our treatment of carious teeth? Very little, if any. Others have made investigations as to the best method of restoring lost tooth substance, and replacing that substance with a foreign body. Dr. Black in that line has come to the front, and has made possible the scientific restoration of those teeth by giving his attention to cavity preparation on a scientific basis, so that when such restorations are made there can be no recurrent decay. That is a step far in advance of former methods. And to-night he has brought before us, in the most scientific manner imaginable, a study of that which has perhaps caused the loss of more teeth than all the other causes combined—and his aim has been to recognize these conditions before they have attained a magnitude where the preservation of the organs in a useful condition is almost beyond possibility. So I consider that without any doubt Dr. Black occupies a pre-eminent position as a scientist in our profession.

In the main, it is one of the happiest moments of my life to be here and listen to Dr. Black—to hear the statements he has made, and to be able to stand here and say that in this locality I have attempted to impress my friends with the truth of the things which Dr. Black has so ably put before us. Many of you perhaps know that on many of these points I have already expressed myself, and I am happy that Dr. Black

has come here to confirm the opinions so expressed by me, because I know you will pay attention to him, where perhaps you would be skeptical if I told you the great good that will result.

Dr. Black spoke of the re-attachment or formation of tissues from the histological standpoint. Many members of our profession have demanded as an evidence of restoration to health or so-called cure of pyorrhea, that tissue should be restored, or that the gum should be caused to re-attach itself to a tooth. They have overlooked the fact that aside from the gingiva, the function of the gum is not to attach itself to the tooth, for there is interposed the alveolar process. The true gum tissue depends on the alveolar process for support, and it is folly to demand that the attachment of the gum to the tooth should be required as an evidence of cure, or that tissue should be made to grow up again with no support.

Serumal Calculus.

In the recitation of the conditions leading up to pyorrhea, Dr. Black did not mention the formation of serumal calculus as a cause, but later on he spoke of calculus as being a secondary condition. That is also a point on which I am glad to have heard him speak.

There should always be taken into consideration the physiological conditions of the individual, which differ. In some individuals there is a destruction of tissue without hyperæmia. In others, with the slightest irritation hyperæmia occurs. In this hyperæmic condition the exudation is formed, resulting in the serumal deposits on the teeth, as I understand it. That hastens the destruction; but there are many cases where the destruction goes on without any serumal calculus. However, it is usually present in the cases which I have observed.

Treatment of Wounds.

In regard to the treatment of such conditions as have been described to-night, the care of the wound is of the utmost importance. We have to remember that after operation wounds should be protected against irritation and infection, and more depends on what the patient does subsequent to operation than on what the operator does. It is very difficult indeed to preserve ideal conditions which will tend toward the formation of granulations and the healing of the wound, where those parts are subjected constantly to the action of decomposing food débris.

Pyorrhea a Result of Injury.

Dr. Black has stated substantially that the conditions he has discussed to-night are invariably the result of an injury; and again I am very glad to be able to state that that has been my belief for some time. In short, I have put it that pyorrhea alveolaris, as we are in the habit of calling it, is the result of an injury, chem-

ical or mechanical—or both—to the tissues surrounding and supporting the teeth. We must remedy the condition which has brought that about, but Nature effects a restoration to health. We do not. We merely remove the products of the disease, and correct the imperfection which made possible the destruction of the tissue, and by instructing our patients and seeing that the instructions are carried out, stimulate those parts so that there is not only no recurrence, but a constant improvement in the tone and integrity of the tissues. I was very glad to hear Dr. Black mention especially the fact that it is useless to attempt to treat only the spots which are apparent to ocular examination. In many cases, especially in anæmic patients, there is no external evidence of a pathological condition; and only on careful instrumentation and probing, and pressing on the parts covering the tooth, can we determine that there is any pathological condition underneath the tissues. If such a condition exist in any part of the mouth, unless recognized and treated at once, it may be too late to save the teeth.

Importance of Occlusion.

The preservation of health depends largely on the proper performance of function. No tissue can be in a perfectly normal condition, and be as highly resistant as it should be, unless proper function is performed. If the teeth are not used as Nature intended, there will be a lowered degree of vitality of all the tissues, and they are more vulnerable to bacterial infection.

We now regard malocclusion as one of the most potent factors in the establishment of pyorrhea. Malocclusion not only injures the supporting tissues, but facilitates the accumulation of food débris, and makes it difficult for the patient to clean the mouth. It is one of the most important factors with which we have to deal. The same is true of septal abscesses. A frequent cause of such abscesses I have found to be stress brought to bear on a certain tooth or teeth, and improper occlusal planes. One of our members spoke of such cases recently—before the meeting—where a septal abscess, or pericemental abscess, as Dr. Black has sometimes called it, has been the result of the injury wrought by excessive stress, due to malocclusion of that individual tooth. We must relieve that stress by some means, and restore those occlusal planes in some way, so that the tooth will not bear that excessive amount of stress.

Cleaning Teeth.

As to the method of cleaning teeth—that is one point on which I feel I must differ with the essayist. In many cases, especially where absorption has taken place, I have found it impossible to have the mouth kept clean by using the vertical motion alone with the brush. In order to keep the surfaces of the teeth perfectly polished, I have found it neces-

sary to have the patients use the lateral motion, and be careful not to scrub the teeth, but to sweep them, in order that no undue friction may be put on the gums, causing absorption. First the lateral motion should be employed with the brush at the gum margin, and then instead of the straight up and down motion, use the rolling motion. The sides of the bristles being laid on the gum, the brush, in being rotated, is brought in contact with the teeth, so that the bristles enter the interproximal spaces, and are thrown out again before reaching the opposite jaw. Unless the patients are cautioned against that long stroke that includes both jaws, it will do injury. They should clean upper and lower separately.

The patients should be instructed to use their teeth for what Nature intended they should be used, and also to use their lips and tongue, that is, for keeping the teeth clean during mastication. In a normal denture, where no tissue has been lost, I believe it possible to keep the mouth perfectly clean with the tongue, if one knows how to use it. Dr. Black has said he has seen some mouths perfectly cleaned in that way, employing the tongue and lips, constantly passing them over the teeth, and I think it stimulates the gums.

Use of Antiseptics.

As to the use of antiseptics, I believe that generally speaking, the less we use of them the better; but I do think they have a place in the mouth, for this reason: Hardly anybody who has had the mouth treated for pyorrhea is able to perfectly clean the mouth after eating. Even with flushing with the syringe, which I advocate and employ in my practice, I find it impossible for them to remove every vestige of débris, and my reason for the use of antiseptics is to prevent irritation of the parts through what remains of the food débris. If the teeth could be made perfectly clean, there would be no occasion for its use, but I believe a mild antiseptic has its place in inhibiting further bacteria culture where there is a culture medium, and it is difficult for the patient to remove every vestige of débris.

Tartar Solvents.

I absolutely deprecate the idea of using any chemical which will act as a solvent of tartar, for the destruction of pathological tissue, or for the stimulation of the living tissue. We should merely remove the obstacles which are in Nature's way, and by mild mechanical stimulation, assist the restoration of tone to the tissues.

I mentioned to my class in the Study Club last winter my theory in regard to the formation of salivary calculus, and I am very much gratified to find that scientific investigation has proven it to be correct. We have tried to notice how salivary calculus is formed, and invariably there

is shown first the gelatinous deposit, and the inorganic salts are deposited on that, and layer upon layer is formed. Dr. Black has demonstrated that to us to-night.

I want to thank you for the opportunity of making these remarks, and I wish personally to thank Dr. Black for the great pleasure I have had in being here to listen to his scientific address.

Dr. M. L. Rhein. It is a great pleasure to have the opportunity not only to be present this evening, but to have the privilege of saying a few words in the presence of this distinguished scientist of our profession. To my mind, the great lesson that Professor Black has brought to the profession this evening is that we should handle our cases on a scientific basis, and depart from the empirical methods which have been so conspicuous in the practice of every branch of the healing art.

As I understand him, it is not his desire, speaking as he does on this occasion to all dentists, that they should accept the didactic precepts of Professor Black, or Dr. Hutchinson, or any man, as to how they should individually do anything, unless they understand first the cause, and why they are using a certain procedure to produce a given result. To my mind, this has been the great aim of all scientific work, and it is the one little point that I desire to impress on this meeting. In my experience of thirty years among dentists, a large number of them always seem to be waiting for some panacea by means of which they are to be enabled to cure certain diseases. To me it has been a source of sincere satisfaction to notice how Dr. Black, in his remarks to-night, has endeavored to warn the profession against this unprofessional attitude.

It is amusing to me how different men look at things from different standpoints. Dr. Hutchinson in his "aviation" discussion seems to have been overcome by a sense of self-satisfaction at the manner in which he agrees with Professor Black. As I have been led to understand Dr. Hutchinson in the past, I cannot see any such recognition of his views in Prof. Black's paper. While I sat here, I myself have been overcome by the same feeling. (Laughter.) I feel that I am in thorough accord with everything Professor Black has said this evening.

It was my pleasure, in 1894, at a meeting of the American Dental Association, at Old Point Comfort, to introduce a classification of peridental diseases, which, to my mind, entirely accords with the classification that Professor Black has touched upon to-night. I started by dividing these diseases into two classes—local and constitutional. As I understand Prof. Black, he has devoted himself to-night entirely to the first class, giving us, however, intimations of the possibility that malnutrition will play an important part under certain conditions. He appeared to

differ with my good friend Hutchinson more radically than I have in the past, when he demonstrated his ability to prevent salivary deposits by the administration of Epsom salts. If I am wrong, I hope Professor Black will set me right.

I am in the most thorough harmony with the expressions in respect to local forms of pyorrhœa to which the essayist has confined himself, especially as to injuries to the septa, and the subsequent destruction that is liable to ensue. In all that I have taught on this subject, or attempted to teach, I have gone over precisely the same form of etiology that Professor Black has—perhaps laying more stress on the subject of malocclusion, because when we leave out the great amount of trouble that is produced in these cases by dentists, as Professor Black has so well said, the injuries from other causes than malocclusion are hard to find.

Malocclusion in Pyorrhea.

Under malocclusion I would include all that he has said in reference to the extraordinary value of correct contact points. It is my conviction that the great and increasing interest in orthodontia will prove a most valuable aid in producing something more akin to normal mouths, to this extent removing one etiological factor in this disease. I refer to such orthodontia as will give correct occlusion,—occlusion that will be maintained—in which there will be no spaces—no missing teeth—no absence of points of contact. It has been my teaching, and my attempted practice in handling pyorrhœal cases, to endeavor to produce such results. When teeth are missing, they must be replaced, and in such a way that they will restore correct occlusion. There must be no defective contact points.

We must take into account the natural wear of the teeth by our patients, and provide for anything that may go on irregularly to interfere with proper occlusion.

I know of a very able man in Vienna,—Dr. Karoly,—who makes the claim that malocclusion is the *only* cause of pyorrhea, and he has written several very able treatises to prove the correctness of his position.

Pericemental and Septal Abscesses.

One point where I am afraid Dr. Hutchinson misunderstood Professor Black, is where he mixed up pericemental abscess with abscess of the septum. They are two entirely distinct pathogenic conditions, and I here—at this moment—challenge Dr. Hutchinson or anyone else to show me a pericemental abscess in a person who can be considered to have a normal organic condition. I have failed to find such a case, and I would like to see such a case produced.

Protrusion of Incisors.

In discussing the effects of disease of the septum of the upper incisors, Professor Black claims that serumal deposits in the subgingival space resulting in a pus pocket lingually is the cause of the protrusion of the incisors.

I have given this particular form of trouble a great deal of clinical study, followed up by very careful examination of quite a large number of such cases that have come under my care. I do not question the fact that there may be such cases as Professor Black has mentioned; but among a large number of carefully recorded cases of that nature, I have failed to find one on my list in which the patient was in a healthy or normal organic condition.

In all of these cases I have found the pulps of the teeth in a diseased condition, as shown by the careful microscopic examination of many such pulps that have been removed. I do not doubt that the irritation of the septum in such cases may be a potent exciting cause in bringing about the commencement of the forward motion; but I am firmly convinced that the disease of the pulp of the tooth itself is the active cause at work, and the reason I take this positive view is because I have recorded a great many cures of such cases, where I have stopped the progress, by simply removing the pulps of such incisors. I have had some of those cases where my treatment of them began at such an advanced stage that it was necessary, on account of their loosened condition, to splint them together. I bring up this point because I would like to hear it further discussed by Professor Black.

Antiseptics.

I want to give my heartiest commendation to all he has said about the worthless character of antiseptics, as far as any practical benefit is concerned, and my heartiest endorsement to what he has said about the care which the patient must give to the brushing of what I prefer to call the gums of the patient, because if they brush the gums properly they cannot fail to brush the teeth in the manner outlined by Professor Black. My instructions are for them to start with the flat side of the brush as high up as possible on the upper, and as low as possible on the lower—to get the invigorating results from the massage of the terminal capillaries before the teeth get their brushing. We must remember that we are treating here the terminal capillary product of that part of the body; and those terminal capillaries are very much weakened from the condition they have been placed in. In a large number of these cases the walls of these capillaries have been shown by Talbot to be in a diseased condition, and the value of continued massage of the most vigorous nature has been so thoroughly substantiated by myself in practice, that I cannot too strongly bring out

this one point. I have no doubt that all of that was in the mind of the essayist when he spoke of brushing the lower teeth up, and the upper teeth down, on all their surfaces after every meal.

Dr. Howard E. Babcock.

I regret very much that I have not had an opportunity to look over Dr. Black's paper before it was presented. I stand here not as a specialist; I am purely a dental practitioner and an eclectic. I shall not attempt to go over the ground that has already been gone over, although I must say the gentlemen have stolen some of my thunder. I think this paper tonight, and the beautiful evidences placed on the screen, of Dr. Black's magnificent work with the microscope and cutting instruments, should impress upon us the importance in all of our dental work of restoring and protecting the interdental spaces.

If we take to heart and practice that one thought, this meeting will be of great advantage not only to us individually, but also to our patients and to posterity. I shall not attempt to enlarge further upon that. I want to bring out one point that was touched upon by Dr. Black, and brought out more fully by Dr. Rhein, but not by Dr. Hutchinson, as he does not believe in it.

Pyorrhea Not Entirely Local.

I am not prepared to admit that pyorrhea alveolaris is purely and primarily a local trouble. I believe there is a dyscrasia that is back of it. There is a difference between the ingesta and egesta of the body, allowing for a certain amount to be used up in the wear and tear. Patients will come to you along towards spring, when they have pyorrheal troubles, and you will clean them up carefully, and give them good instructions, and they go away for the summer. When they come back in the fall you will find a very different condition from what you saw in the spring. The time limit may be about the same, and yet there is a pronounced difference. They have been away, relieved from nervous strain, and have been deprived probably of rich foods and condiments. They have been out in God's world, out in the open air, and every organ has been at play.

Whether it is improper eating, or nervous strain, or overwork—in nearly every case you will find something back of it. The main organs act vicariously, one for the other, when they are out of order, or where one is embarrassed. One of our noted rheumatism specialists claims that rheumatism is due to this lack of equilibrium. He made the discovery that where rheumatics contracted typhoid fever, and were put to bed and kept on a diet of milk, when they recovered from the typhoid fever they were free from the rheumatism. He claimed it was due to the improper ingestion of the proteid substances, taken far in excess of what the sys-

tem required—the organs, particularly the liver and kidneys, were overburdened, and as in rheumatism this is thrown into the joints, why is it not possible that these deposits are thrown into the sockets of the teeth?

Dr. Black spoke of the number of patients he sees in a year—10,000 or more—and spoke of the canines and laterals which are thrown forward. I had a case of a young girl who was nervous and broken down where there was this marked protrusion. There was no mouth breathing, or anything of that kind. I told her mother to keep her out of doors, and give her proper food, and see that she had proper exercise, and in a short time I noticed an absolute cure. I asked them what they had done, and they said they had done nothing. The jaw had grown up to those teeth. The irritation that had existed was due to the irritation of the septal membrane. During that six months the jaw expanded, and threw the teeth into proper alignment, and the whole trouble disappeared.

Cleansing the Teeth.

Dr. Black spoke of using only water for cleaning. I thought, why not add salt? I found a medical book, written by a gentleman from Chicago—I believe he was the founder of the Rush Medical School. He advocated the cleaning of the teeth with the tooth-brush and water, and a little salt added to the water. He spoke of the mild antiseptic properties, and the tonic effects on the gum.

In reference to this material which precedes the deposition of calculus, I would ask if it is the same as the placques we have heard about.

Dr. Black. Not at all, doctor.

Dr. Babcock.

Then, I think all the gentlemen here would be glad to learn of the source of it. I personally feel very much gratified to be here to-night, because I consider that it is an historic evening. It will be a landmark in dental history. As another gentleman from Chicago, a few years ago, placed a milestone for us—so this gentleman from Chicago has to-night placed a milestone for us—although this is not his first.

I want to express my pleasure and appreciation at being here.

Dr. Ferris.

This evening has been extremely interesting to me, and, as previous speakers have stated, it is surely an historic occasion. Dr. Black has abolished, practically, the use of antiseptics, and tooth powder, in the cleansing of the human mouth. I believe we stand in a unique position as specialists. We have to treat diseases of both a primary and a secondary cause. This organ contains secretions which perform physiological action on foods, as well as with its mechanical surfaces. We were not born with a tooth-brush in our hands, and I believe fully that one of these days—and that not very far off—we will be able to so take care of the primary

causes, that we may revert to Nature's conditions, and permit the salivary secretions in their normal balance to care for the lesions of the oral cavity.

Dr. Black has given some illustrations of his artificial plate, and the effect of the salivary deposits upon it. He speaks of the use of drugs in the form of an alkaline cathartic, which controls that deposit. The alkaline medicine contains certain chemical elements which have their physiological effect on this condition. A mouth with a normal occlusion performing its function is well cleansed, and in many instances we can find cases where a tooth-brush is never used, and the patient grows to be 70 or 80 years of age with no caries, provided the life is regular and according to Nature's demands. If we treat these primary lesions in this manner, we may throw away the tooth-brush.

The secondary lesion, however, is the result of a broken down organ, and the lack of function of the teeth in their occlusal purpose, which must change the chemistry of our whole body. The re-establishment of a normal occlusion will reduce or do away with pathological properties in excreta of the human body. It has been proven in my hands, as well as by others.

There is a modification of the secretion or the environment in which the tooth is living. If we can utilize drugs to counteract the chemical balance, we may reduce the lesions which are due to this secondary consideration.

In listening to Dr. Babcock's remarks in reference to salt—diverging from the paper for a moment—I wish to relate an experience where the use of salt had been carried to excess. It was in the mouth of a dentist in Scranton. He had a malocclusion of his teeth, and developed a hyperhydrochloridea. He was treated by a number of specialists, and finally solicited my assistance. On questioning him, I asked if he had used salt in any way. He claimed he did not use much salt, but I found that he was using an excessive quantity of sodium chloride. He had a tickling in his throat at night, and he would take a little salt, and that would relieve him. On the elimination of salt from his diet, entirely for about three months, he was cured of his hyper-hydrochloridea. A minute record of his salivary excretions was kept with the urinary analysis.

Dr. Leroy. I am pleased to have the opportunity to thank Dr. Black for the beautiful exposition he has given us to-night. The fact is, we are treating this disease from two standpoints, and we cannot expect to eradicate it by local treatment alone. In spite of the fact that we reduce the local manifestations, we find a recurrence takes place. I do not say that the local manifestations cannot be corrected by local treatment, but it is not sufficient. That would be the only point I would make to-night.

Prof. Black. I do not know what I can say in closing the discussion, except to thank the gentlemen who have spoken, and those who have listened, for the general courtesy and the kind things which have been said.

Some of these days Dr. Ottolengui will get the paper into print, and then I hope you will sit down and read it carefully, and find out more of what is in it.

Dr. Ash. While a vote of thanks would very inadequately express my appreciation of Dr. Black's work, and the trouble he has taken to come here and present it to us, I think we should at least extend such a vote of thanks to him.

A rising vote of thanks was tendered to Prof. Black.

Adjournment.

Second District Dental Society.

February Meeting.

A regular meeting of the Second District Dental Society of the State of New York, was held on Monday evening, February 13, 1911, at the Kings County Medical Library Building, No. 1313 Bedford Avenue, Brooklyn, N. Y.

The President, Dr. Ottolengui, occupied the chair, and called the meeting to order.

The Secretary read the minutes of the previous meeting, which were approved.

The President of the New York State Dental Society, Dr. A. R. Cooke, was invited to occupy a seat on the platform.

Dr. Nodine stated in relation to the Oral Hygiene question, that Dr. Evans, of Chicago, had been invited to deliver an address, under the auspices of this society, at the Brooklyn Institute, to interest the public in the importance of this matter.

President Ottolengui stated that in his opinion there was not a man in the country who has worked more industriously and more unselfishly for this movement than Dr. Nodine, and he wished to make public statement of that fact.

Dr. Hyatt read a petition in regard to securing the passage of a law with reference to dental nurses.

President Ottolengui: Trained Dental Nurses. "I would like you to understand why this matter is particularly interesting at the present time to the Second District Society. All over the country dentists are desirous of aiding the children in the

public schools, and in that way aiding the entire community. In my opinion, Dr. Fones, of Bridgeport, has thought out the best solution, and that is, that there should be attached to every public school a dental clinic, which shall have a sufficient number of internes and paid trained nurses.

"I was invited recently to address the Brooklyn Institute on the care of the teeth of the children in the public school. I suggested that we should, as a test of what can be done, establish a clinic in one of the public schools of this city, which should have two internes and ten dental nurses. Each nurse can clean a set of teeth in half an hour, and in the five hours of the school day she could clean ten sets. Ten nurses could clean one hundred sets and, in the twenty school days of each month, they could clean 2,000 mouths. Thus all the children would have their teeth cleaned once a month. The internes could, in the meantime, examine the teeth of these children, and advise them to go to their dentists, and the nurses could see that the work is done. Of course, those who are too poor to pay could have the work done for them. From the children's standpoint, there would be this wonderful preventive dentistry going on. I was asked if that would not, if carried out, eventually do away with the dental profession. I do not think so. In spite of the gentlemen who claim that prophylaxis will prevent caries, I do not think it will be carried to such a magnificent extreme that all caries will be prevented. However, all occasion for the exposure of pulps should be eliminated, and the cases cared for so early that there might eventually be no need for the men to put in bridgework.

"We cannot do that unless the legal status of the dental nurse is established, and if that were made as clear as possible to our State Society—even if it were refused eight years ago when Dr. Rhein suggested something similar—it might not be refused now. However, if we cannot do it as a society, we may inaugurate it as private citizens."

The President then introduced as the essayist of the evening, Dr. George Edwin Hunt, Dean of the Indiana Dental College, who read a paper entitled: "Regarding Dental College Work."

Dr. Hunt.

I want to express my appreciation of your kindness and courtesy in inviting me down here. It is the first time I have had the pleasure of appearing before the Second District Dental Society, although a few years ago I had the pleasure of appearing before the New York State Dental Society. It has gotten so with our modern methods of transportation that we are more than ever brothers with one object in life. We men from the middle West are able to come down here and tell you things you do not know, at a minimum loss of energy and expenditure of time, and I assure you it is a great pleasure for us to come here and tell you these

things. (Laughter.) Feeling that many of you are not fully cognizant of what is being done in dental education to-day, I have had sent here practically all the technique work done by one student in his three years of college work. He duplicated some of it, but not a great deal. This is all from the college with which I am connected. I want to say that this exhibit can be duplicated by any dental teaching institution of any worth at all, in the United States. It is not unique at all with the Indiana Dental College, as similar exhibits can be shown by all of the dental teaching bodies, as you may determine for yourselves if you ever have the good fortune to attend that association of teachers—the Institute of Dental Pedagogics.

(Dr. Hunt read his paper.)

Discussion on Dr. Hunt's Paper.

Dr. B. Holly Smith, Baltimore.

I would say that any excuse that gave me opportunity to meet with the men whom I have known for years as my friends, to give me a chance to breathe the same air and think the same thoughts, would be a gratifying one; but to bring me here to open the discussion of a paper read by my dear and intimate friend, George Edwin Hunt, of Indianapolis, I assure you nothing could give me greater pleasure.

I deplore, however, the flippancy of the essayist. George Edwin Hunt is the kind of a man who, if his leg were shot off, would first ask for a cigarette, and then ask why the devil the fellow did not shoot his leg off a little lower down, so he could use the other joint!

We have travelled together a great deal, and I have found him absolutely solid in his views, righteous in his understanding, exact in his performance; thus there is little left for me to say as to his representation of the problem of education on the part of the dental schools.

The basis of our training as dentists must, of course, be accepted as a basis that has been familiar to all of you—no peculiar training that we know anything about has arisen as yet to be approved for the dentist. You are yourselves the product of the dental college, I assume, and you are not such bad examples of that product, and I am not ashamed of you. I attended myself at a dental college in 1881, and it seemed to me everything was done for me. I do not recall such scenes as the essayist spoke about.

The fact that there have been recent criticisms of dental training is nothing very peculiar, because criticisms arise even in one's own family. I do not care how small the circle is—somebody who is on the outside of the circle will say that the centre of that circle is too d—n hot, and it ought to be cooled off—or something to that effect!

The fact that dental education has accomplished what it has in the last thirty years—I am just about thirty years old in dentistry—ought to make every man feel proud. The fact is, medical education at that time was no further ahead than dental education.

Years ago Chapin Harris and Horace Hayden approached a medical college and said: "We think we can establish a specialty in medicine; won't you give us a chance?" And the medical faculty laughed them to scorn. What did those men do—brave-hearted, big men? Just went on and established a dental college, and they taught just such dentists as you are. Are there any better dentists anywhere? Go to Europe. Are there any better dentists there? Everybody comes over here and asks us why is it? We do not compare with Germany in our manufactures, but all over Europe they ask for "American dentists." Was that done by a university or a medical college? No! It was done by teaching dentistry. The dental department of a medical college came up then, and was the first experiment that was tried after the first dental college. Why was that started? Through some altruistic and philanthropic means? No; it was started because the medical men became impressed with some work being done in the training of dental students, and thought it would be an adjunct of value to that medical college; so the dental department of a medical school was instituted.

University Dental Departments.

Next we have the university establishing a dental department. That is an old institution, and an institution which I have no disposition to say anything to reflect on. I know many dental departments have been started in medical schools, where there was little excuse for it. I know some of the dental departments of our universities have done splendid work, and I have no complaint to make. I do not believe any of them have been started with any more altruistic purpose than was the purpose of the originators of the dental school.

The various statements that were made by the gentleman who represented a university—one of the members of an association of universities comprised of five schools—who saw fit (and I did not object to that, because it was desirable on both parts) to withdraw from the Faculties Association and then form a body of their own, and who came out with some flamboyant proclamation that all dental teaching, not of their particular kind, and of their peculiar association, should be abrogated, reminded me of a little story.

Is their attitude different from that which is pictured in a little incident I will relate of a little fox that lived in a little mountain fast-

ness, with no pickings on that side, so he went off into the valley where the farmer's goose was fat. One evening, when he had satisfied his appetite and spent half his night, he thought the morning was coming, and he hurried back over the stones, over the brook, up through the foot-hills, and through no path of his own; but picking his way, and knowing the morning was almost there. Just as he came over the hill, he looked back, when the sun like a ball of fire was tinting the whole of the Eastern heavens with her glory, and seeing it through the hair of his tail, he said: "Great God! I have set the world a-fire!"

I do not believe any such consummation has occurred. To be perfectly frank with you, I think with our essayist that there is a place for the teaching of dentistry in any university; but to be perfectly frank with you also, I tell you the teaching of dentistry under the control of university trustees is not a consummation devoutly to be wished for. For this reason, I mention Johns Hopkins University. I live in the home of Johns Hopkins University, and know every one of the trustees, and have often talked with them on this subject. Johns Hopkins left a will for the establishment of this university for the teaching of every branch of the medical science. The trustees there do not know anything much about dentistry, and they do not care. In regard to founding a dental department, they said: "If we had $50,000 for a building, and you could guarantee we would have enough students to support it, we would consider it." Do you think any other university regards it in any other way? Do you think any other university is so magnanimous that it would establish such a department without considering the revenue? When our friend from California says that our private schools shall be swept out and schools managed by university standards shall prevail, I ask you is there any university standard for dental training, and will there be any? How many dentists will have control in such schools? How many men who are not dentists—who are physicians—know how dentistry should be taught?

I take it that the essayist has proven that dental teaching up to the present day is about as good as it could be. These little universities we are speaking of—I could mention them by name, but I would prefer not to, as some of them are my friends—exact no more in their preliminary requirements than do the other colleges of the National Association of Dental Faculties, not one iota. Whether they give any more, I am not prepared to say. Every man who is a teacher, and has the interest of his students at heart, finds out where they come from, and what they have been doing; and I have seen no quality of special excellence among the students that have come to me from these institutions. I do not deny that this may be because a student who leaves a college is not an excellent

student, at least I do not regard those who leave my college as excellent students. We require as much of them in a preliminary way, and try to give them as much in course, and if any man tells me that in large classes, in general work, a student can be better taught to do certain things than in small classes, I will argue that with him until to-morrow morning.

I will never forget Webb, nor Briggs, nor Atkinson—those great men I have come in contact with and seen operate—there was a halo around everything they did, and I went to my books to find how they did it, and why? They inspired me! There would have been no Rugby without Arnold, and there would have been no Johns Hopkins without Hopkins; but the men who have made dentistry are right here almost—teaching dentistry, and while some may be associated with someone who might be responsible for the paper that was read at Denver—someone who possibly assisted in giving it some little audience—I deny that dentistry has fallen behind in any sense, of any other calling that has had the life and the men to teach it. Wipe out those men, and get any others you please, then attach to a university, and you would not do any better.

I recall the story that is told of a young man who wanted to go away, but he said he really could not afford it. Finally a member of the press said to him, "That is all right—I will loan you my pass." The young man got on the train with many dubious feelings. The conductor looked at the pass and said, "Are you a reporter on the Louisville *Courier?*" "Yes." "Well, you are not properly described here; but that makes no difference. Mr. Henry Watterson is up in the front car, and I will take you there." He went up reluctantly, but he had to follow the conductor. The conductor went in and said, "Mr. Watterson, this young man claims to be connected with your paper. Is he a reporter?" The gentleman said, "Not only is he a reporter, but one of the best we have."

The conductor left the car, and the young man sank into a seat; but afterwards he went over and said: "Mr. Watterson, I am not a reporter at all. I am travelling on another man's pass." The other man said, "Don't you worry; I am not Mr. Watterson!"

That is what these universities are doing. They are travelling on the dental college pass.

President Ottolengui. Dr. Smith has intimated we have several kinds of dental schools—the independent school, the department of a medical school, and the school which is a department of a university. We have with us to-night a gentleman who had long experience in the managing of an independent school, and

who has since then undertaken to build up, and is magnificently building up, the dental department of a medical college—Dr. I. Norman Broomell.

Dr. I. N. Broomell, Philadelphia.

After listening to the serio-comic production of my Hoosier friend, and to the Baltimore oriole, it is an extremely difficult matter for me to add anything in the way of discussion, although I must confess I could hardly include Holly Smith's speech as a part of a discussion.

Just to show that there are various ways in which dental colleges may be abused, I brought this little letter with me, which came into my college office before I left home. It is written in a clear, legible hand, and it is from a small boy:

PHILADELPHIA, PA.

Dear Sir.—Will you kindly send me my dollar what I have paid you, as I am not going back there any more. They near killed me on Wednesday. I was getting a gold crown tooth and a gold filling. The student put the filling in, and he said he is going to take it out again on Monday. I guess not.

Yours truly,

_____.

So, you see, all the criticism does not come through the dental journals.

As a co-worker with George Edwin Hunt in the cause of dental education, I have been asked to come here and take part in this discussion. I am naturally interested in everything pertaining to dental education, and it might be supposed I would agree with everything the essayist has said, and, to a great extent, this is true. He has told you very truthfully that a great part of the criticism of dental colleges at the present time comes from men who are not well informed. There is no doubt but that that is a correct statement—men who have been out of college for many years, and who are not well informed, make the keenest critics. He has explained the difference between the dental college of old, and that of the present. I well remember my college days, and they date farther back than either of the previous speakers, and I am surprised to hear Dr. Hunt make the statements about the colleges twenty years ago, because if they were as bad twenty years ago, what were they when I went to school? I do not know much about Hunt's early education. Thirty years ago we had no such schools as he speaks of. We had poor equipment and poor light, but we had energetic students and earnest faculties. We had men whose text-books we are reading at the present time.

I am sorry to say we sometimes hear criticism from men who have

just left college. It is rather amusing to see how faithful the students will be while they are in college—how they will swear loyalty to the school and promise almost everything; but within a year, all this has been forgotten.

Let us compare the growth of the dental school—and I am speaking now in favor of the dental college of to-day—with the growth of the medical school. The first college was founded in 1839. I have made a determined effort to find out when the first medical school was founded, but I have not learned; but we will say it is 200 years ago. You may say this is not an argument, but I say it is. If we grant that the average dental college of to-day is teaching dentistry just as well as the average medical school is teaching medicine, why have we not made greater advancement? Because while dentistry has been taught for seventy years, medicine has been taught for centuries, and yet we are keeping pace with the medical schools.

Another argument in favor of the dental college is that of the comparative length of the course. I have contended that if it requires three years to thoroughly study dentistry, it ought to require twenty-five years to thoroughly study medicine, because we recognize the fact that our field is a small one compared with the study of the whole body. We have little of the serious conditions to deal with. Our practice is not a matter of life or death, while the medical practitioners do have to face death constantly. I contend we are greatly in advance of medicine with our three years' course, when they have only four or five years.

Medical Education of Dentists.

I cannot agree with the essayist when he discourages what I hope may some time come to pass—a union of the medical and dental colleges in the way of a common course. I hope to see that brought about. I hope in the near future that every dentist will be compelled to take a medical degree, and I hope it will be as the essayist has intimated—that the student may elect or select his specialty after the second or third year. If a little medicine is good for the dental doctor, more medicine is better. Why give him any at all? Why should the dentist know anything about histology, or pathology, or the circulation of the blood? Why give him just these few facts, and no more? We have heard that a little knowledge is a dangerous thing, and it seems to me what a dental graduate gets at just this time is perhaps more harmful to him than helpful.

I do not believe the degree of M.D. would give us a better status in a given community than the degree of D.D.S., but I believe a combined course would be the best thing for all concerned.

The essayist has said that we ourselves are willing to admit we are

medical specialists, but we do not often hear of the medical profession accepting us as specialists. If we want to be accepted as such—and we must want to be, according to the essayist—then there is no better way for us to receive the respect of that profession than by having the M.D. degree, with the D.D.S. as a special degree.

Another thing which the dental colleges have recently been accused of is the fact that they do not teach the business side of dentistry. Many dental journals have been publishing articles along this line. On the next page, perhaps the same journal will say editorially that the dental colleges do not teach enough dentistry. How can we do both, if we have not sufficient time? I contend that it is not the function of the dental college to teach the business side of dentistry. Each man forms his own business methods, and he can work them out to suit his own case.

Entrance Requirements, Past and Present.

One feature which the essayist did not speak of, and which I think is pertinent to the subject, is the comparative entrance requirements which are now exacted, as compared with those of a few years ago. High as these entrance qualifications may be, usually 45 or 60 counts—15 counts meaning a year's high school work—high as this standard appears to be, I am sorry to say that the quality of the student has not increased with the higher entrance qualification. I believe to a great degree the count system is responsible for this. I believe many students enter college through the fact that they have a certain number of counts, and these counts may be taken in languages alone. That is the case in Philadelphia, sometimes—students may have 60 counts, all of which are in the languages, while they are deficient in their elementary subjects. This brings an undesirable class of students, and at the same time it prohibits many good men from entering.

Dr. Smith's argument sounds to me very much like the last plea for an independent school. He has spoken of the dental college, which is connected with a medical school, and of the dental department of the university. We all know Dr. Smith belongs to a school that has neither of such connections.

Dr. Smith. I beg your pardon. We have connection with the College of Physicians and Surgeons, where our anatomical work and our laboratory work is done.

Dr. Broomell. I had not noticed that in any recent catalogue.

Dr. Smith. It has been an established thing for twenty-five years. It is a thing that has been published and known by everybody who knows anything about the college.

Dr. Broomell.

Nevertheless, I take Dr. Smith's argument as a plea for the independent school, because his school with a few others is classed in that category. Otherwise, why should he be digging and knifing the colleges that are part of the medical school, or the dental departments of universities?

The Faculties Association.

Reference has also been made to the Faculties Association. For a long time I honored that body, not by my presence, but as an association, and occasionally attended it. I want to say this—and I only say it in self-defense—because the Faculties Association has been mentioned by the last speaker, and he evidently believes this Association is about to pass in its checks. I want to say that the reason for this is evidently the same reason which caused them to refuse certain schools admission. One school in particular—the school which I represent—(and this may seem to be a personal matter, but I am not presenting it in that way), applied for admission. We prepared our catalogue along the proper lines, as far as educational features were concerned: we went down to Atlanta, knocked at the door of this Faculties Association, and asked for admittance, and we were denied. The reason was this: Instead of the committee looking over the pages of our catalogue to see what we were going to teach, they looked at the last page and saw what we were going to charge. It, therefore, appealed to us as a commercial association, and from that time we have had no desire to enter that body.

Dr. Smith.

I was a member of the Executive Committee of the National Association of Dental Faculties when Dr. Broomell appeared and asked permission to enter that body. He could not do it, because the regulations of that association said that an organization such as he represented should have filed its application according to a certain form, with certain recommendations, and the statement that he makes in regard to looking over his catalogue, and finding out what they charged students, is absurd. The fact that he has no respect for the association is simply because his college was refused admittance.

President Ottolengui.

We have another teacher with us to-night, who represents another kind of school. It also was for a long time an independent school, and since then it has become a department of a university. We will be pleased to hear from Professor Goslee, of Chicago.

Dr. Hart J. Goslee, Chicago.

Ordinarily, I would be exceedingly well pleased to enter into a discussion of this subject; but to-night I feel somewhat embarrassed in doing so, for two or three reasons, one of which is that I agree

(as I usually do) with practically everything that has been said by the essayist. Another reason is that the discussion so far has practically agreed with him also. Yet I know there is one gentleman, at least, waiting to take the opposition side, who will undoubtedly bring up a very interesting discussion. I have never taken the criticism of dental educational work seriously, because I have felt safe in the knowledge which I thought I had, of the fact that dental educational work had progressed very rapidly. I agree fully with the essayist when he says it has progressed more rapidly than has medical education, or any other one particular educational line, and therefore feeling safe in our progress, and realizing from close observation that every dental school was trying its best—whether a university school, a private institution, or otherwise—was working hard, and every man who represented it was doing his best as a teacher, I have not paid much attention to the criticism.

Medical Education of Dentists.

One phase to which I have given attention has been as to the advisability of our affiliation with medical colleges. I believe all fundamentals of medicine should constitute a part of the dental course. I do not know whether that can best be accomplished by requiring a medical degree or not. We have not reached that point where we can certainly know whether it would be advisable to require every dentist to take the M.D. degree, or to take a certain number of years in medical work, and then complete his dental education. It is a matter which is being considerably agitated at the present time, and I believe in Chicago it is only a question of a very few years when we will have two years of medical study required, and possibly two years of dental study following that. The medical profession in the West do not look down upon dental education, as some of you seem to think, in some sections. They are with us, and give us all the encouragement possible. No less a person than Dr. William Evans, who was mentioned to-night as having been invited to address you soon, has been making a very strong effort to bring the medical and dental professions closer together, and to unite their professional efforts, and I believe he will succeed in time. I think the better groundwork the average student has in medicine the better dentist he will be. However, I would not like to see graduation in medicine an absolute essential to the practice of dentistry—at least at the present time. The minute that becomes necessary, the profession of medicine will dominate the practice of dentistry, and we are not ready for that yet, because of the conditions which exist in continental Europe to-day, which conditions account for the fact that the American dentist is considered far ahead of the European dentist. If we were governed and controlled by the medical profession entirely,

which the necessity for one degree would demand, I am afraid it would be a retrogression, and we would encounter the same conditions the European dentist is encountering now.

I believe we should be proud of our progress. I cannot agree with Dr. Smith in believing that this university proposition agitated last year will do any great harm. I believe a college will be known by its work and its products, and upon that it will stand or fall. It will be simply a question of the survival of the fittest.

President Ottolengui. We have thus far been told that the independent school, the dental department of the medical school, and the dental department of the university is each one competent to teach dentistry. The last gentleman said that a school must be judged by its product, and we have a gentleman here who is an expert on that subject, as he has for many years been examining the product as a member of the New York State Board of Dental Examiners. I will ask Dr. A. R. Cooke, now president of the New York State Dental Society, to say a few words to us.

Dr. A. R. Cooke, Syracuse, N. Y. I have been very much interested in the subject of education, as it has been presented to you in its various aspects, and I have been particularly impressed with the earnestness with which the various theories have been advocated. However, as Dr. Ottolengui has said, the product is what we want practically to consider, for the proof of the pudding is said to be in the eating thereof. As one of the Examiners of the State of New York for the last seven or eight years, it has been my privilege to read over the papers on one subject, and to be more or less conversant with the product issued to us on other subjects, which you are teaching your students in your dental schools. It has been my observation that the students that come to us are in a way more thoroughly prepared in the theory of dentistry than they are in the practical utilization of those theories; that they will write us a very good paper on anatomy, chemistry, histology, or any other theoretical subject, but when it comes to the practical application—as we require in this State, and which I consider as important or more so than the theoretical part—it is a matter frequently discussed in the Board of Examiners that the students have not the ability to apply what they have learned. They have learned the theory of dentistry, and the fundamentals of medicine; but when it comes to the practical application—to the filling of cavities and the matter of judgment as to what they shall do—they seem deficient. It sometimes seems to me we are trying to fill a round hole with a square peg. You cannot make a first-class dentist out of a man who is not primarily a fairly good mechanic. You may give him a collegiate

education; you may teach him to extract Greek roots; you may inject into him a knowledge of ancient history, and make a polished gentleman of him; but if he is not a mechanic naturally and at heart, he will not make a practical dentist, as we are practising dentistry to-day. Perhaps when the time when dentistry shall consist entirely of prophylaxis, and we have no compound cavities to fill, nor plates to insert, nor any prosthetic work to do, we will have arrived at a period when the mechanic can be relegated to the background; but at the present time the best dentists in New York or Philadelphia, or elsewhere, are fine mechanics.

The Count System.

Personally, I would rather have as a student in my office, as a young man to make a dentist of, someone who has had a thorough grounding in some mechanical training—as a jeweler or a machinist—than one who has had a high theoretical education. Those 60 counts are all right; but as Dr. Broomell has told you, a gentleman of foreign extraction coming here with a knowledge of German, French, and perhaps some other language, can enter a college with a large proportion of his counts credited to him on the score of languages. He is not exactly on a par with our American boy, who has only plain English—perhaps a product of the country district—but who is a good mechanic, and that is what you made your original dentists of here. You did not make them out of college men, but out of boys from the farm, or the village school. Such a boy will make a better dentist than the man who has a high education, and I am not decrying high education in the least, because there is not a man who feels the lack of higher education more than myself; yet I do value some training I received before I went to college.

It is not an uncommon thing for the Board of Examiners to have students come to us who cannot insert a gold filling. It is not uncommon for them to take from four to six or eight hours to do a gold filling. They all have 60 counts in the schools, and no doubt pass a good theoretical examination. I do not think they could file up a good head on a nut. I do not think you would have trouble in selecting a good workman if you go through the laboratories, by simply watching the file. There is no tool, nor instrument the dentist uses, that better exemplifies the mechanic than that little despised instrument. While I advocate and appreciate the requirements of the State law in demanding the counts, and while we must accept the examination as the only practical test at the present time, I feel we ought to have some better qualification. If the colleges received only men who were practically adapted to dentistry, we would not have those misfits. There are misfits in every profession—

as many in medicine as in dentistry—and the pot cannot call the kettle black. There are as many misfits in law as in the ministry, and when we come to the day when we can select just the right men for the professions, we will have arrived at the millennium.

President Ottolengui. There was one gentleman referred to who would take the opposite side of the discussion. I will call upon Dr. Rhein, as his name was mentioned.

Dr. Rhein. I do not know why I should be placed in the category of opposition to this paper. There is no one who has a greater admiration for the self-sacrificing life of a teacher, in any direction. I believe that the true teacher exemplifies the highest virtues that are given to the human race, and consequently a man would be devoid of reasoning power if he failed to appreciate for an instant the sacrifices that have been made by dental teachers from the inception of the first American dental college.

It is impossible for anyone to compete with the essayist in the biting sarcasm with which he has ornamented his beautiful production; but sarcasm in itself is no argument, and there are a great many points that have been brought up in this discussion that I think are of vital interest, and have not been touched upon in quite the light that some may look upon it.

I am fond in a way of teaching, myself, and I take great pride in doing a little teaching in the dental department of one of our universities; and, consequently I do, in a personal way, resent the imputations cast on that side of the question by Dr. Smith in his discussion. I have had the pleasure of a personal investigation of the school of the essayist, and I have come away with the highest admiration for the true teaching instinct as I find it in that school. That does not, however, for one instant, tell us what instinct would be in that school if it is run as an independent school by the successor of George Edwin Hunt. There is a principle involved in this matter of proprietary dental schools. I have, in the course of the little observation that we get in thirty years of experience, been able to see evidences of anything but the spirit that I saw in the Indiana Dental College, when investigating the conditions of other schools run upon this basis. I have seen in some such schools only one motive, and that was financial gain at the close of the school year, and I am not afraid to stand here and say that freely and openly. And then I say, when education is taken up by a great university, this temptation is removed. Some men can stand up against temptation, and some cannot. That is aside from the chief question. It is the question of a great principle—of how educational matters should be conducted, and how they shall best be conducted. It makes no difference whether, on an

investigation of each dental educational institution in this country, you prove in overwhelming figures that the proprietary educational dental schools of the present day are giving the best dental education, it does not for a moment disprove the argument that for the future advancement of education our schools should be departments of great universities, where there is no possibility of the dollar entering into the minds of the managers of our schools, and this is the whole keynote as to the difference between a proprietary school and that of a department of a university.

I want to take the part of Professor Broomell. I never knew his school had been rejected by the Dental Faculties Association; but I do know that the departments of great universities in this country have been rejected by that association, because they had schools incorporated under the laws of their States, which said they must give to their students a course in their schools at a sum less than that set by the Faculties Association.

Dr. Holly Smith.

I do not want to allow a false impression about Dr. Broomell's school to go out. The school would have been accepted the next year if Dr. Broomell had been willing to wait. I want to say that there was no objection to the school at all, except there are certain regulations that a school shall apply one year and be elected the next, and Dr. Broomell wanted to enter at once.

Dr. Rhein.

Dr. Broomell understood that he was rejected because the fee for the student was not up to the fee which the Dental Faculties Association demands from students. The State of Iowa and the State of Michigan have inaugurated fine dental schools, and they dictate to their faculties a sum which is so much lower than the Dental Faculties Association demands, that they cannot belong to that association. Dr. Smith says this is the law of the Dental Faculties Association. This shows then the defect of that association. It is their duty to make the conditions that exist in our real educational institutions.

American Dentistry Abroad.

There have been remarks made here to-night about our wonderful standing as American dentists. My friend, Professor Goslee, brought up the comparison between American dentists and the dentists who are educated in continental Europe; but I differ with him on that subject. In 1901, when I travelled through Europe and came back, I would have agreed with him; but that condition I want to assure you, from my point of observation, does not exist to-day. I defy any man who visited the International Dental Congress

at Berlin last year—who saw the clinical display there, not by America, for there was not one American clinical exhibit in that exposition—to say he ever saw its like in this country. Our esteemed confrère, whom we have just honored in Paris, Dr. N. S. Jenkins, at Albany last May echoed this sentiment in no uncertain terms. We sit back here listlessly, dreaming of our past glory. Take a trip through Germany, Austria or Hungary, and see what they are doing there. My criticism, if it be so called, does not apply to the men who work in the manner which the essayist has so beautifully portrayed; but how can he speak for all the institutions in this country? By what right does he constitute himself the spokesman for every institution that calls itself a dental educational institution? I deny him that right. The fact that American medical colleges are defective in a large measure is no reason why we should allow our colleges to be defective. Educational matters in medicine have been having an upheaval in this country, that is producing astounding effects by reason of the Carnegie Educational Foundation sending a man who is no doctor of medicine, no doctor of dentistry, no doctor of law—a man who has simply been selected for this work by virtue of his executive ability as an educator—through the medical colleges of this country. He has investigated, and he has shown them up in the daylight in such a way that they are known one from the other. At the meeting at Denver, a resolution was unanimously passed requesting that similar investigation be extended to dentistry; but for some reason which I do not know—in the last moments of that convention, when very few members were present—a resolution came in from the Executive Council recalling that motion, and stultifying the action of the main convention, because there were very few people present at that time.

Dr. Smith. The gentleman who wrote the resolution requested its withdrawal.

Dr. Rhein. That does not alter the circumstances. I consider that very unfortunate, because I know that committee will take up the investigation of dental colleges when they have finished with what they are now undertaking, and it places our National Association in the position of fearing this investigation.

I feel from listening to the essayist, as though he meant to convey to us this idea, that the dental student when he leaves his college is better fitted to practise dentistry than a great many dentists who have gone out years before. I take issue with that argument. It has been filled with holes by the remarks of the president of our State Society. I am pleased that so much of the discussion tended towards the idea that the ideal condition will be when a general medical education would be neces-

sary to practice dentistry. The degree means nothing. It is what the man knows that counts. I do not believe that time is fast approaching. It is impossible, much as I would like to see it. I believe it is the only ideal one, but I stand here and admit that that condition is impossible to attain until the investigations in general medical education disclose to the medical educator the fact that the general medical man is greatly deficient in his education unless he receives a general knowledge of the diseases connected with the mouth and the teeth and the parts adjacent thereto. We can never work in harmony with that form of education until we make the general medical curriculum recognize that defect in their work, and all the attempts to make these two branches work together will be ineffectual until we attain that end. They have long since reached that condition in Hungary. I have found in Buda Pesth the most ideal dental educational institution, because every medical student must take his course in the principles of dentistry—not for dental technique—just the same as he studies the eye and the ear, in order to understand their relationship to the body. He must go to the dental department in its own building, and take his course and pass his examinations there.

I am led to make these remarks because I have seen in this small college the highest ideals I have found in any dental educational institution in the world, and I have examined a number of them.

It brings up another point—that large schools I do not think tend to make good doctors, whether medical or dental. The Johns Hopkins school that has been mentioned in this discussion to-night is known as one of the greatest medical schools in the world, not for the reason the essayist has given—I deny the statement of the essayist that it is known because of its product of scientists—it is known for its product of great doctors. Great surgeons have come from that institution and great doctors, because the classes are so small that every man in the class has the opportunity and privilege of working at the bedside of the patient, and at the operating table in the amphitheatre, while in the large institutions they sit off in a distance, watch these things and learn them theoretically. In that school is exemplified the one thing that has made American education a thing of the past—that is, the clinical experience imparted to the student; and that is one of the features that should not be lost sight of in this discussion. There is no doubt in the minds of any fair-minded men that the teachers of this country, who have done great work in dental education, are entitled to much more praise and respect than they have received; but I say in closing that a teacher of that type will never take exception to criticism of any kind, because it is contrary to the type of man who makes that kind of teacher.

President Ottolengui. Dr. Broomell said he did not recognize the picture Dr. Hunt drew of a school of twenty years ago. I think it is nearer thirty years since I was in a school exactly like that; but that school is not like that to-day. It has made progress. I was going to call on Dr. J. Bethune Stein to speak, because his father was a teacher at a time when I was in the school; but I find he has gone. I also wanted to have Dr. Stein speak because he has seen that model institution in Buda Pesth that Dr. Rhein speaks of, I will, however, call on Dr. Hillyer to tell us why that school has improved.

Dr. Hillyer. You ask a question at the last, and that very question brings a direct answer. My teaching associations have covered about seventeen years, and I believe that the answer to your question is that the improvements that have taken place in our college, or anywhere, have been due to the efforts of the Institute of Dental Pedagogics. I know of no institution in the world that has done more for the advancement of dental education—and by that, the raising of standards—than that institution. I regret exceedingly that this institution comes to the East so seldom. It was in New York a number of years ago, but very few took cognizance of its presence and visited it. I hope it may possibly come within your scope to see the work that is being done.

It is hard to take up the discussion at this time, because there have been a good many things that I do not think were wisely discussed at this time. There are other things that we would be glad to discuss at an earlier hour, but I think we would now like to hear Dr. Hunt close the discussion.

Dr. Rodine. I would like to call the attention of the gentlemen to the fact that the gentleman in Denver who has been referred to had his proof in Denver, and was willing to submit it, and the Association would not appoint a committee to take it up. No one spoke against the proposition which was made at that time. Many of them criticized it, but they did not take up the charges and answer them specifically and categorically.

Dr. Hunt. In the Faculties Association we have a rule which says that if the faculty of a school changes almost in its entirety, so that the new faculty, which is to conduct the school in the coming year has been materially changed, the school shall make application for re-instatement. That rule was passed to protect the association in the event that a school changed hands, as far as its faculty was concerned, and it is a wise provision. A school might retain membership, and the faculty change, very much to the

detriment of such institution. In this case, the rule was one that worked both ways. The change in the faculty was so complete that the rules required an application for re-instatement of the school, and it had to lay over for a subsequent meeting. I am speaking absolutely from knowledge of the conditions, because I was then, and am now, secretary of the association, and that is why Dr. Broomell's school was not taken in at the meeting of which he speaks. There would have been no doubt about it, had the application gone over to the next meeting.

As to Dr. Rhein's strictures upon medical college education, I interpret that pretty liberally, and am glad he agrees with me so thoroughly. How many hours a week do you put in at the university?

Dr. Rhein. I do not consider myself as representing the university. While I have the pleasure of being connected with the staff, I by no means represent the teaching staff of the University of Pennsylvania in any form whatever. I give but a few desultory lectures, and I tried to make that perfectly plain.

Dr. Hunt. I ask Dr. Rhein how many hours does he put in at teaching?

Dr. Rhein. I give five or six different lectures there.

Dr. Hunt. I do not think Dr. Rhein's connection with the educational staff has been sufficiently close to state how universities feel in regard to the matter. Now I do know that the university dental departments are just as anxious to get students as any other dental school. The same thing applies to all medical schools, and all teaching institutions. We never say we have enough, that we do not want any more. Neither do the universities say that. I do not think the money question is entirely eliminated from the dental departments of the universities.

In regard to Dr. Cooke's discussion, it is no doubt correct; but this is where a little of the injustice comes in—of the man criticizing the entire institution of dental teaching from his own viewpoint. Dr. Cooke has had an extensive experience with dental students who appear before the State Board of the State of New York, but there are forty odd other State Boards, and while the New York Board probably gets a larger number of students than any other Board, the majority of the students come from this vicinity.

Dr. Cooke. I should say six or eight of the colleges in this part of the country are represented.

Dr. Hunt. That is not universal, however, and that is the attitude of the people who criticize these institutions. You cannot imagine how full of gratitude my heart is for the manner in which you have stayed here until this late hour and listened to all this discussion; and if any one ever wants to get appreciation for a paper he has written, I would advise him to come to Brooklyn.

A hearty vote of thanks was tendered to the essayist, and to the gentlemen who took part in the discussion.

Ajournment.

EDITORIAL

A Million Dollar Debt.

For some months the writer has been engaged upon the almost impossible task of discovering to what extent the cast gold inlay has entered into the general practice of dentistry. In casual contact with dentists the question asked has received quite varied answers. "I have thrown away my pluggers and now cast all my gold fillings," said one man. "I know nothing about cast inlays, as I never have made one," answered another man. "If I were obliged to give up my casting machine I would positively go out of practice," said a third; whereas, the very next man interpolated, snorted, "Cast inlays? Don't talk to me about cast inlays. I have bought no less than five different casting machines, and they are all up on the shelf with my cataphoresis outfit and my celluloid press. Oh, no! The good old gold foil filling for mine." And so on, and so on. Evidently the quest in this direction was idle.

Then the thought came that if it could be learned to what extent gold is being purchased for casting purposes this would serve as a fair basis for an estimate. This investigation has been made, and almost immediately it developed that no positively accurate knowledge is obtainable. Nevertheless, the inquiry has proven enlightening as well as interesting.

A letter was written to every known dealer in dental gold asking for information as to the total quantity of pure gold sold during the previous twelve months, which gold was known to have been bought for use in casting inlays. It was promised, of course, that information should be treated as confidential and that in publishing data based upon the sales reported the identities of the dealers should not be divulged. Thus names must be suppressed, but figures may be given, and a few comments may be quoted from the letters, because these comments throw an interesting side light upon the present methods of filling teeth and upon the natural cupidity of man.

The Use of Pure Gold for Filling Teeth.

Prior to the advent of the cast gold inlay, occasionally a dentist might be accused of using some cheap alloy of gold, instead of the pure metal. Patients making such accusations based their suspicions upon the fact that certain gold fillings had discolored. Yet the dentists were always guiltless. Why? Because for making foil fillings there is no such thing as a low karat gold foil obtainable in the market. What is the situation now? Let us consider a few abstracts from the letters received from the dealers.

Scrap Gold Used for Cast Inlays.

One declares that he cannot estimate how much of his gold is used for inlays, and then adds: "By observation in buying scrap gold we find that all grades of gold have been used for inlays; some are of very low karat. Judging by what we find in gold scrap, there is more of the lower karat used than of 24K. Dentists coming into the office inform us that they use 24K for inlays, but the majority seem to use anything they have at hand." Another, dealing mainly in gold prepared for fillings, thinks that none of his gold has been used for casting inlays, because "dentists would prefer to buy some cheaper gold, in some crude form." Another, after reporting his sales, adds: "We also notice a falling off in the quantity of gold scrap sold to us, and we are aware that a good portion of this is being used for inlay purposes." Still another explains the difficulty of actually gauging the quantity of pure gold sold for inlays, especially as many of his customers buy 22K for that purpose. This writer then expresses

the opinion that "most of the gold used for inlays is the scrap of the office."

After the above it is refreshing to receive from another dealer the report that he has a constantly increasing business of refining scrap for dentists, returning to them the pure gold to be used for cast inlays. It is with regret that we must refrain from mentioning this dealer by name, as his report reflects credit upon the dentists in his State. But should not the men in other States feel ashamed hereafter to face their dealers, since now we find that it was the dealers and not the dentists' consciences that compelled the use of 24K gold for filling teeth during the era when foil was exclusively used for gold fillings?

Quantity of Gold Used for Cast Inlays.

Fifteen dealers and refiners of gold have answered the letter sent out. Of these seven declare that it is impossible accurately to determine what part of their gold has been used for inlays. Eight others likewise explain the difficulty of replying with certainty, and then give reports only of sales of pure gold of which they are reasonably sure that their customers bought for inlays. The total sales by these eight dealers in the past twelve months amounted to 9,000 ounces. Of course this is not accurate, but it certainly represents a very, very conservative estimate of the quantity of gold used in one year for making cast inlays. First, we do not here take into account the scrap gold inlays, nor the coin gold, 22K gold, and platinized gold used for inlays. Then seven out of fifteen dealers make no report. Again, the eight who do report have all made conservative estimates, or positive statements.

The Dentists' Profit on Cast Inlays.

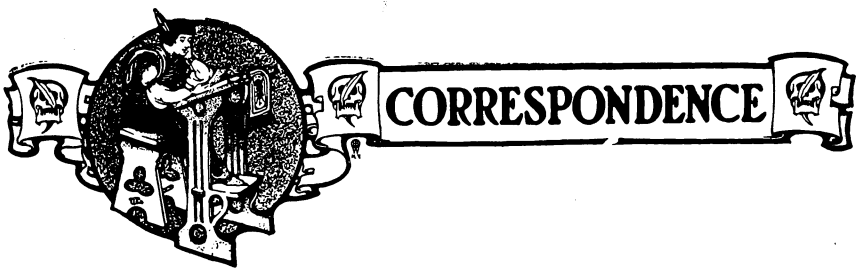
It seems warrantable, therefore, to say that at least 9,000 ounces of gold have been cast into inlays during the past year. To what extent have the dentists profited by this work? This is another difficult problem, but after consulting with a number of dentists and others in a position to know some thing of dental fees, it seems a conservative estimate to state that seven dollars is the average fee for an inlay weighing one pennyweight. Thus the average receipts from one ounce of gold would be $140. Deducting the cost, $24 (the highest price charged for 24K), we find the average

profit to the dentist using one ounce of gold for cast inlay work to be $116. The total profit for the minimum estimate of 9,000 ounces used in the past year would be $1,044,000.

A Parable.

Once on a time there came out of the West a Wise Man, and he wandered into the Great Metropolis, and from there he Preached unto the Children of Dentistry. And he taught these Children how that they might earn more Money with less Labor; and how that they might fill more Teeth with less Pain.

And these Children verily were good Scholars, for they listened unto the Voice of the Prophet, and they heeded his Words. And since that time the Prophecy of the Prophet has come to pass, even as he Prophesied. For these Children of Dentistry have filled more Teeth with less Pain, and they have earned more Money with less Labor. And verily, when these Children of Dentistry are met together in the great Market Places they have much commune with one another about the Profit, for the Profit has grown until it amounts to more than a Million of Dollars in one Year. But what do they say of the Prophet?



Banquet to Dr. William Smedley.

On May 4th the dental profession of Colorado united to do honor to Dr. William Smedley at a testimonial banquet at the Brown Palace Hotel in Denver, upon the occasion of his 75th birthday.

Over one hundred persons were present, and it was an occasion that will long be remembered with keen satisfaction by those who attended.

Although the affair bore just a trace of an official nature, in being fathered by the living Presidents of the State Dental Association, yet it was no further than this considered a State Society function, but was meant to be a call to the profession at large throughout the State to assemble to honor this Grand Old Man of Dentistry in Colorado, and the magnificent distances which separate the several communities of the State alone prevented many from attending whose impulses stirred them to a desire to be present and have a part in the expression of esteem that the occasion was meant to convey.

The Scriptural allotment of years has been more than passed by this splendid man and he is still fired by the same enthusiasm which in his younger days led him to the incorporation of the State Dental Association, and also the Dental Society of the City of Denver, having served as the first President of both organizations.

He is still active in the daily work of dental practice and is still serving as the Treasurer of the State Association, which office he has held consecutively for the past twenty-one years.

The words of esteem and tribute which were paid to him on that evening by the different speakers in response to the toasts could easily have brought embarrassment to the average mortal, and yet in his "Good night" to us we found the same modest, unassuming nature, wondering what he had done to deserve the tributes that had been laid at his feet.

The responses to the various toasts all took the form of a genuine expression of the affection and love which Dr. Smedley draws out from all with whom he comes in contact, and his remarkable activities, not only in his professional life but in his civic and fraternal duties, were well brought out by those who spoke.

A very interesting feature of the occasion was a series of lantern views showing the early scenes in Dr. Smedley's life and descriptive of a journey by ox team across the trackless plains before the days of railroads from the Missouri River to the northwestern Pacific coast, as well as some of the early scenes of Denver showing Dr. Smedley's first office locations.

To view the wonderful changes since these days not so many years ago up to the splendid Denver as she is to-day was indeed a treat and a revelation, to the younger men, at least.

Aside from the pleasure that the profession had in tendering this testimonial to Dr. Smedley was the splendid justification of the fact that never has man in his social relation been more ready and anxious to render tribute to honor and integrity.

As a more tangible expression of the sentiment of the evening Dr. Smedley was presented with a beautiful watch which, while measuring the passing of Time, yet symbolizes with unvarying regularity the heart throbs of love of those who are privileged to call him friend and comrade.

TOASTS.

Toastmaster, Dr. H. A. Fynn, Denver.

Dentistry in the Early Days of Colorado—Dr. J. M. Norman, Denver.

Dr. Smedley's Influence on the Young Professional Man—Dr. Rea P. McGee, Denver.

Biography and Stereopticon Illustrations—Dr. E. R. Warner, Denver.

The Influence of a Good Woman—Dr. Henry B. Hayden, Colorado Springs.

The Professional Man's Duty to His Community—Dr. Charles A. Monroe, Boulder.

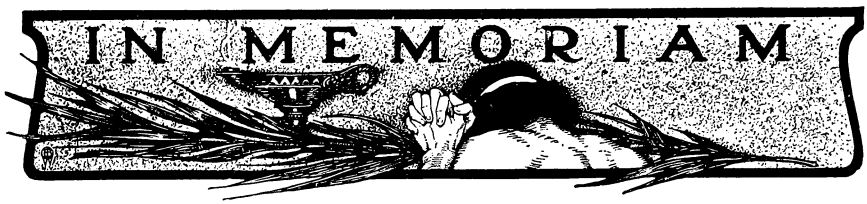
Dr. Smedley and the Dental Associations—Dr. F. S. McKay, Colorado Springs.

Reminiscences—Dr. A. C. Watson, Denver.

A Good Man Appreciated—Dr. W. T. Chambers, Denver.

Good night—Dr. Wm. Smedley.

F. S. M.



Dr. John Quincy Byram.

Doctor John Quincy Byram was born at Paragon, Ind., June 1, 1871.

When he was 19 years of age he went to the State of Washington, where he served for three years as assistant in the dental office of Dr. L. E. Ervin, of Seattle, Wash.

In 1893 he came to Indianapolis and took up the study of his chosen profession at the Indiana Dental College, where he graduated with honors in 1896. During his three years' course in dentistry he maintained a dental office in Irvington, a suburb of Indianapolis, practising by license of a permit granted by the State Board of Dental Examiners. After his graduation he retained his practice in Irvington until the fall of 1898.

In 1896 he accepted a position in the Indiana Dental College as clinical instructor in the infirmary.

In the fall of 1898 he gave up his practice in Irvington to devote his entire time to teaching at the Indiana Dental College. His first chair with the faculty was that of Prosthetic Dentistry. In 1901 he took the chair of Crown and Bridgework. In 1902 he began his self-prepared course of instruction on Porcelain Work. In the meantime he had charge of all the teaching of Prosthetic Technic from 1896 to 1908. From 1908 until his death he taught Advanced Technic, Prosthetic Dentistry, Crown and Bridgework, Porcelain Work, and was Clinical Instructor at the college.

The 1st of August, 1908, Dr. Byram entered into the active practice of dentistry in the Willoughby Building, associated with Doctors H. R. McKinstray, Arthur Guedel and Carl D. Lucas.

In 1906 he served as President of the Indiana State Dental Association, and in 1911 as the President of the Institute of Dental Pedagogics, at the Washington, D. C., meeting.

He was an active and enthusiastic member of the Delta Sigma Delta Fraternity, and was elected Supreme Worthy Master of the Fraternity at its Denver meeting in 1910, having served four years previously as treasurer of the Fraternity.

In 1907 he published a book entitled "The Art of Filling Teeth with Porcelain," which work has proven him to be an authority in this line of dental surgery.

His services as lecturer and clinical demonstrator were very much in demand, and for the past eight years he has lectured upon and demonstrated scientific dental operations before dental associations within nearly every State in the United States. To do this meant incessant labor and much thought. He was never known to shirk a duty, no matter how large nor how small. Unselfish in all dealings with his professional brothers and every one with whom he came in contact; always possessing a happy, jovial disposition, ever ready to help his fellows and always ambitious to gain further knowledge in his profession, he was loved and respected highly by all who knew him.

On account of over-work his health had rapidly been failing for the past two years, and although he had tried hard to pull himself together, he felt it impossible for him ever to recover.

On the night of June 28, 1911, in a moment of mental aberration, he took his own life in his private office. He left a note as follows: "My nerves are gone; I have tried hard for two years to get well, and I find I am getting worse every day. If this keeps up, I will be unfit for anything. I cannot stand up under this strain any longer."

His widow, Bertha C., a son, John Quincy, Jr., a daughter, Mary Anna, of Indianapolis, his mother, Anna, and sister Anna D., of Irvington, and his brother, P. M. Byram, of Camden, Arkansas, survive him.

He was buried in Crown Hill Cemetery, Indianapolis, Ind., July 1, 1911.

C. B. L.

Dr. C. L. Buckwalter.

Dr. C. L. Buckwalter, who practised dentistry for thirty years at Loudonville, Ohio, died of paralysis on the 9th of February, 1911, at the age of sixty-six years, and was interred at Loudonville.

Dr. Buckwalter is survived by two sons, both of Pittsburgh, Pa.

C. A. S.